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**U. S. DEPARTMENT OF AGRICULTURE**  
**Agricultural Marketing Service**  
**Grain Division**

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# **Official Grain Standards of the United States**



**SRA-AMS-177**

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U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
GRAIN DIVISION

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X **Official Grain Standards**  
**of the United States** X

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Standards for wheat, effective June 15, 1957; Corn, effective October 1, 1959; Barley, effective July 1, 1956; Oats, effective June 1, 1959; Rye, effective July 1, 1951; Grain Sorghums and Flaxseed, effective July 1, 1935; Soybeans, effective September 1, 1955; and Mixed Grain, effective August 1, 1959.

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**Important Features of Grain Inspection**

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This publication supersedes Miscellaneous Publication 722, Handbook of Official Grain Standards of the United States.

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## FURTHER INFORMATION

For further information regarding the United States Grain Standards Act, the regulations of the Secretary of Agriculture thereunder, or the official grain standards, apply to any office of the Grain Division, or to the Administrator, Agricultural Marketing Service, Washington 25, D.C.

# Official Grain Standards of the United States

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## STANDARDS FOR WHEAT<sup>1</sup>

### Terms defined

For the purposes of the Official Grain Standards of the United States for Wheat:

**Wheat.** Wheat shall be the grain of common wheat (*Triticum vulgare*), club wheat (*T. compactum*), and durum wheat (*T. durum*) which, before the removal of the dockage consists of 50 percent or more of one or more of these wheats and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act and which after the removal of the dockage contains 50 percent or more of whole kernels of one or more of these wheats.

**Classes.** Wheat shall be divided into the following seven classes: Hard Red Spring Wheat, Durum Wheat, Red Durum Wheat, Hard Red Winter Wheat, Soft Red Winter Wheat, White Wheat, and Mixed Wheat.

**Hard Red Spring Wheat.** This class shall include all varieties of hard red spring wheat and may include not more than 10.0 percent of wheats of other classes. This class shall be divided into the following three subclasses:

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<sup>1</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.



(1) *Dark Northern Spring Wheat.* This subclass shall be Hard Red Spring Wheat with 75 percent or more of dark, hard, and vitreous kernels.

(2) *Northern Spring Wheat.* This subclass shall be Hard Red Spring Wheat with 25 percent or more but less than 75 percent of dark, hard, and vitreous kernels.

(3) *Red Spring Wheat.* This subclass shall be Hard Red Spring Wheat with less than 25 percent of dark, hard, and vitreous kernels.

**Durum Wheat.** This class shall include all varieties of white (amber) durum wheat and may include not more than 10.0 percent of wheats of other classes. This class shall be divided into the following three subclasses:

(1) *Hard Amber Durum Wheat.* This subclass shall be Durum Wheat with 75 percent or more of hard and vitreous kernels of amber color.

(2) *Amber Durum Wheat.* This subclass shall be Durum Wheat with 60 percent or more but less than 75 percent of hard and vitreous kernels of amber color.

(3) *Durum Wheat.* This subclass shall be Durum Wheat with less than 60 percent of hard and vitreous kernels of amber color.

**Red Durum Wheat.** This class shall include all varieties of red durum wheat and may include not more than 10.0 percent of wheats of other classes.

**Hard Red Winter Wheat.** This class shall include all varieties of hard red winter wheat and may include not more than 10.0 percent of wheats of other classes. This class shall be divided into the following three subclasses:

(1) *Dark Hard Winter Wheat.* This subclass shall be Hard Red Winter Wheat with 75 percent or more of dark, hard, and vitreous kernels.



(2) *Hard Winter Wheat.* This subclass shall be Hard Red Winter Wheat with 40 percent or more but less than 75 percent of dark, hard, and vitreous kernels.

(3) *Yellow Hard Winter Wheat.* This subclass shall be Hard Red Winter Wheat with less than 40 percent of dark, hard, and vitreous kernels.

**Soft Red Winter Wheat.** This class shall include all varieties of soft red winter wheat and may include not more than 10.0 percent of wheats of other classes. This class shall be divided into the following two subclasses:

(1) *Red Winter Wheat.* This subclass shall be Soft Red Winter Wheat which may contain not more than 10.0 percent of soft red winter wheat grown west of the Great Plains area of the United States.

(2) *Western Red Wheat.* This subclass shall be Soft Red Winter Wheat containing more than 10.0 percent of soft red winter wheat grown west of the Great Plains area of the United States.

**White Wheat.** This class shall include all varieties of white wheat, and may include not more than 10.0 percent of wheats of other classes. This class shall be divided into the following four subclasses:

(1) *Hard White Wheat.* This subclass shall be White Wheat with 75 percent or more of hard (not soft and chalky) kernels and may contain not more than 10.0 percent of wheat of the white club varieties.

(2) *Soft White Wheat.* This subclass shall be White Wheat with less than 75 percent of hard (not soft and chalky) kernels and may contain not more than 10.0 percent of wheat of the white club varieties.

(3) *White Club Wheat.* This subclass shall be White Wheat consisting of wheat of the white club varieties and may contain not more than 10.0 percent of other white wheats.

(4) *Western White Wheat.* This subclass shall be White Wheat containing more than 10.0 percent of wheat of the white club varieties and more than 10.0 percent of other white wheats.

**Mixed Wheat.** This class shall include all mixtures of wheat not provided for in the classes Hard Red Spring Wheat, Durum Wheat, Red Durum Wheat, Hard Red Winter Wheat, Soft Red Winter Wheat, and White Wheat.

**Grades.** Grades shall be the numerical grades, sample grade, and special grades provided for on pages 7-15.

**Dockage.** Dockage shall be weed seeds, weed stems, chaff, straw, grain other than wheat, sand, dirt, and any other material other than wheat, which can be removed readily from the wheat by the use of appropriate sieves and cleaning devices; also underdeveloped, shriveled, and small pieces of wheat kernels removed in properly separating the material other than wheat and which cannot be recovered by properly rescreening or recleaning. (See also paragraph on percentages, page 5, and paragraph on grade designation, at top of page 12.)

**Foreign material.** Foreign material shall be all matter other than wheat which is not separated from the wheat in the proper determination of dockage.

**Other grains.** Other grains shall be rye, oats, corn, grain sorghums, barley, hull-less barley, flaxseed, emmer, spelt, einkorn, Polish wheat, poulard wheat, cultivated buckwheat, and soybeans.

**Damaged kernels.** Damaged kernels shall be kernels and pieces of kernels of wheat and other grains which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, moldy, diseased, or otherwise materially damaged.

**Heat-damaged kernels.** Heat-damaged kernels shall be kernels and pieces of kernels of

wheat and other grains which have been materially discolored and damaged by heat.

**Wheats of other classes.** Wheats of other classes shall be wheats other than that specified in the respective tables on pages 7-11.

**Shrunken and broken kernels.** Shrunken and broken kernels shall be all kernels and pieces of kernels of wheat and other matter that will pass readily through a  $0.064 \times 3/8$  sieve.

**$0.064 \times 3/8$  sieve.** A  $0.064 \times 3/8$  sieve shall be a metal sieve 0.032 inch thick perforated with slotted holes 0.064 inch by  $0.375 (3/8)$  inch with approximately 2,633 perforations per square foot.

**Stones.** Stones shall be concreted earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water.

## Principles governing the application of the standards

The following principles shall apply to the determination of the classes and grades of wheat:

**Basis of determination.** Each determination of dockage, temperature, odor, garlic, live weevils or other insects injurious to stored grain, and distinctly low quality shall be upon the basis of the grain as a whole. All other determinations shall be upon the basis of the grain when free from dockage.

**Percentages.** All percentages shall be upon the basis of weight. The percentage of dockage when equal to 1 percent or more shall be stated in terms of whole percent and when less than 1 percent shall not be stated. A fraction of a percent shall be disregarded.

**Moisture.** Moisture shall be ascertained by the air-oven method prescribed by the United States Department of Agriculture, as described

in Service and Regulatory Announcements No. 147, issued by the Agricultural Marketing Service, or ascertained by any method which gives equivalent results.

**Test weight per bushel.** Test weight per bushel shall be the weight per Winchester bushel as determined by the method prescribed by the United States Department of Agriculture, as described in Circular No. 921 issued June 1953, or as determined by any method which gives equivalent results.

### **Grades, grade requirements, and grade designations**

The following grades, grade requirements, and grade designations are applicable under these standards:

## Hard Red Spring Wheat

*Grades and grade requirements for the subclasses Dark Northern Spring Wheat, Northern Spring Wheat, and Red Spring Wheat of the class Hard Red Spring Wheat. (See also paragraphs on special grades, pages 12-15.)*

Grade	Minimum test weight per bushel	Maximum limits of—				
		Damaged kernels		Foreign material	Wheats of other classes	
		Total	Heat-damaged kernels		Total	Durum and/or Red Durum
	Pounds	Percent	Percent	Percent	Percent	Percent
1 Heavy <sup>1</sup> .....	60	2.0	0.1	0.5	5.0	1.0
1 <sup>1</sup> .....	58	2.0	0.1	0.5	5.0	1.0
2 <sup>1</sup> .....	57	4.0	0.2	1.0	5.0	2.0
3 <sup>1</sup> .....	55	7.0	0.5	2.0	10.0	3.0
4.....	53	10.0	1.0	3.0	10.0	10.0
5.....	50	15.0	3.0	5.0	10.0	10.0
Sample grade.....	Sample grade shall be wheat which does not meet the requirements for any of the grades from No. 1 Heavy to No. 5, inclusive; or which contains more than 16.0 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.					

<sup>1</sup> The wheat in grades No. 1 Heavy, No. 1, and No. 2 of this class may contain not more than 5.0 percent, and in grade No. 3 not more than 8.0 percent of shrunken and broken kernels.



## Durum Wheat and Red Durum Wheat

*Grades and grade requirements for the subclasses Hard Amber Durum Wheat, Amber Durum Wheat, and Durum Wheat of the class Durum Wheat and for the class Red Durum Wheat. (See also paragraphs on special grades, pages 12-15.)*

Grade	Minimum test weight per bushel	Maximum limits of—				
		Damaged kernels		Foreign material	Wheats of other classes <sup>1</sup>	
		Total	Heat-damaged kernels		Total	Soft Red Winter, White, and/or Red Durum
	Pounds	Percent	Percent	Percent	Percent	Percent
1 <sup>2</sup> -----	60	2.0	0.1	0.5	5.0	1.0
2 <sup>2</sup> -----	58	4.0	0.2	1.0	5.0	2.0
3 <sup>2</sup> -----	56	7.0	0.5	2.0	10.0	5.0
4-----	54	10.0	1.0	3.0	10.0	10.0
5-----	51	15.0	3.0	5.0	10.0	10.0
Sample grade-----	Sample grade shall be wheat which does not meet requirements for any of the grades from No. 1 to No. 5, inclusive; or which contains more than 16.0 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.					

<sup>1</sup> Red Durum Wheat of any grade may contain not more than 10.0 percent of wheats of other classes.

<sup>2</sup> The wheat in grades No. 1 and No. 2 of each of these classes may contain not more than either (a) 5.0 percent of shrunken and broken kernels or (b) 8.0 percent of shrunken and broken kernels together with broken kernels of wheat of any size which remain in the sieved sample; and wheat in grade No. 3 of each of these classes may contain not more than either (a) 8.0 percent of shrunken and broken kernels or (b) 12.0 percent of shrunken and broken kernels together with broken kernels of wheat of any size which remain in the sieved sample.

### Hard Red Winter Wheat

*Grades and grade requirements for the subclasses Dark Hard Winter Wheat, Hard Winter Wheat, and Yellow Hard Winter Wheat of the class Hard Red Winter Wheat. (See also paragraphs on special grades, pages 12-15.)*

Grade	Minimum test weight per bushel	Maximum limits of—				
		Damaged kernels		Foreign material	Wheats of other classes	
		Total	Heat-damaged kernels		Total	Durum and/or Red Durum
	<i>Pounds</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1 <sup>1</sup> -----	60	2.0	0.1	0.5	5.0	0.5
2 <sup>1</sup> -----	58	4.0	0.2	1.0	5.0	1.0
3 <sup>1</sup> -----	56	7.0	0.5	2.0	10.0	2.0
4-----	54	10.0	1.0	3.0	10.0	10.0
5-----	51	15.0	3.0	5.0	10.0	10.0
Sample grade-----	Sample grade shall be wheat which does not meet the requirements for any of the grades from No. 1 to No. 5, inclusive; or which contains more than 15.5 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.					

<sup>1</sup> The wheat in grades No. 1 and No. 2 of this class may contain not more than 5.0 percent and in grade No. 3 not more than 8.0 percent of shrunken and broken kernels.



## Soft Red Winter Wheat

(d) *Grades and grade requirements for the subclasses Red Winter Wheat and Western Red Wheat of the class Soft Red Winter Wheat. (See also paragraphs on special grades, pages 12-15.)*

Grade	Minimum test weight per bushel	Maximum limits of—				
		Damaged kernels		Foreign material	Wheats of other classes	
		Total	Heat-damaged kernels		Total	Durum and/or Red Durum
	<i>Pounds</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1 <sup>1</sup> .....	60	2.0	0.1	0.5	5.0	0.5
2 <sup>1</sup> .....	58	4.0	0.2	1.0	5.0	1.0
3 <sup>1</sup> .....	56	7.0	0.5	2.0	10.0	2.0
4.....	54	10.0	1.0	3.0	10.0	10.0
5.....	51	15.0	3.0	5.0	10.0	10.0
Sample grade.....	Sample grade shall be wheat which does not meet the requirements for any of the grades from No. 1 to No. 5, inclusive; or which contains more than 15.5 percent of moisture or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.					

<sup>1</sup> The wheat in grade Nos. 1 and 2 of this class may contain not more than 5.0 percent and in grade No. 3 not more than 8.0 percent of shrunken and broken kernels.

## White Wheat

*Grades and grade requirements for the subclasses Hard White Wheat, Soft White Wheat, White Club Wheat, and Western White Wheat of the class White Wheat. (See also paragraphs on special grades, pages 12-15.)*

Grade	Minimum test weight per bushel	Maximum limits of—				
		Damaged kernels		Foreign material	Wheats of other classes	
		Total	Heat-damaged kernels		Total	Durum and/or Red Durum
	<i>Pounds</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1 <sup>1</sup> -----	60	2.0	0.1	0.5	5.0	0.5
2 <sup>1</sup> -----	58	4.0	0.2	1.0	5.0	1.0
3 <sup>1</sup> -----	56	7.0	0.5	2.0	10.0	2.0
4-----	54	10.0	1.0	3.0	10.0	10.0
5-----	51	15.0	3.0	5.0	10.0	10.0
Sample grade-----	Sample grade shall be wheat which does not meet the requirements for any of the grades from No. 1 to No. 5, inclusive; or which contains more than 15.5 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.					

<sup>1</sup> The wheat in grades No. 1 and No. 2 of this class may contain not more than 5.0 percent and in grade No. 3 not more than 8.0 percent of shrunken and broken kernels.

## Mixed Wheat

*Grades and grade requirements for Mixed Wheat. (See also paragraphs on special grades, pages 12-15.)* Mixed wheat shall be graded according to the numerical and Sample grade requirements of the class of wheat which predominates in the mixture, except that the factor "wheats of other classes" and the grade specifications for "No. 1 Heavy" shall be disregarded.

### Grade Designation

*Grade designation for all classes and subclasses of wheat.* The grade designation for wheat shall include in the order named the number of the grade or the words "Sample grade," as the case may be; the word "Heavy" when applicable; the name of the applicable subclass, or in the case of Red Durum Wheat and Mixed Wheat the name of the class; the name of each applicable special grade; and when applicable the word "dockage" together with the percentage thereof. In the case of Mixed Wheat, the grade designation shall also include, following the name of the class, the name and approximate percentage of hard red spring, durum, red durum, hard red winter, soft red winter, and white wheat, if any, contained in the mixture.

### Special Grades for Wheat

#### *Tough wheat*

**Requirements.** Tough wheat shall be (a) wheat of any of the classes Hard Red Winter Wheat, Soft Red Winter Wheat, or White Wheat, or of the class Mixed Wheat in which wheat of any one of the classes Hard Red Winter Wheat, or Soft Red Winter Wheat, or White Wheat, predominates, which contains more than 14 percent but not more than 15.5 percent of moisture, and (b) wheat of any of the classes Hard Red Spring Wheat, or Durum Wheat, or Red Durum Wheat, or of the class Mixed Wheat in which wheat of any one of the classes Hard Red Spring Wheat, or Durum Wheat, or Red Durum Wheat, predominates, which contains more than 14.5 percent but not more than 16 percent of moisture.

**Grade designation.** Tough wheat shall be graded and designated according to the grade requirements of the standards applicable to such wheat if it were not tough, and there shall be added to, and made a part of, the grade designation, the word "Tough."

*Smutty wheat*

**Requirements.** Smutty wheat shall be wheat which has an unmistakable odor of smut or which contains balls, portions of balls, or spores, of smut in a quantity equivalent to more than 14 balls of average size in 250 grams of wheat.

**Grade designation.** Smutty wheat shall be graded and designated according to the grade requirements of the standards applicable to such wheat if it were not smutty and according to the methods described either in (a) or (b) of this subdivision.

(a) **Smut dockage.** The smut shall be removed by scouring and the loss in weight of the wheat caused by the removal of the smut shall be calculated in terms of percentage based on the total weight of the grain when free from dockage. The percentage so calculated shall be stated in terms of half percent when smut dockage is present in a quantity equal to less than one percent, and in terms of whole percent when present in a quantity equal to one percent or more. A fraction of a half percent shall be disregarded when smut dockage is present in a quantity equal to less than one percent, and a fraction of a percent shall be disregarded when smut dockage is present in a quantity equal to one percent or more. The percentage of the smut dockage, so calculated and stated, shall be added to the grade designation, preceding the statement of dockage, if any.

(b) **"Light Smutty" and "Smutty."** (1) In the case of smutty wheat which has an unmistakable odor of smut, or which contains balls, portions of balls, or spores, of smut, in excess of a quantity equal to 14 balls but not in excess of a quantity equal to 30 balls of average size in 250 grams of wheat, there shall be added to and made part of the grade designation the words "Light Smutty"; and

(2) In the case of smutty wheat which contains balls, portions of balls, or spores, of smut,



in excess of a quantity equal to 30 balls of average size in 250 grams of wheat, there shall be added to and made a part of the grade designation the word "Smutty."

*Garlicky wheat*

**Requirements.** Garlicky wheat shall be wheat which contains two or more green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 1,000 grams of wheat.

**Grade designation.** Garlicky wheat shall be graded and designated according to the grade requirements of the standards applicable to such wheat if it were not garlicky; and

(a) In the case of garlicky wheat which contains two or more but not more than six green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 1,000 grams of wheat, there shall be added to and made a part of the grade designation the words "Light Garlicky"; and

(b) In the case of garlicky wheat which contains more than six green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 1,000 grams of wheat, there shall be added to and made a part of the grade designation the word "Garlicky."

*Weevily wheat*

**Requirements.** Weevily wheat shall be wheat which is infested with live weevils or other insects injurious to stored grain.

**Grade designation.** Weevily wheat shall be graded and designated according to the grade requirements of the standards applicable to such wheat if it were not weevily, and there shall be added to and made a part of the grade designation the word "Weevily."

*Ergoty wheat*

**Requirements.** Ergoty wheat shall be wheat which contains more than 0.3 percent of ergot.

**Grade designation.** Ergoty wheat shall be graded and designated according to the grade requirements of the standards applicable to such wheat if it were not ergoty, and there shall be added to and made a part of the grade designation the word "Ergoty."

*Treated wheat*

**Requirements.** Treated wheat shall be wheat which has been scoured, limed, washed, sulfured, or treated in such a manner that the true quality is not reflected by either the numerical grade or the Sample grade designation alone.

**Grade designation.** Treated wheat shall be graded and designated according to the grade requirements of the standards applicable to such wheat if it were not treated, and there shall be added to and made a part of the grade designation a statement indicating the kind of treatment.

## STANDARDS FOR CORN<sup>2</sup>

### Terms defined

For the purposes of the Official Grain Standards of the United States for Corn (Maize):

**Corn.** Corn shall be any grain which consists of 50 percent or more of whole kernels of shelled dent corn and/or shelled flint corn (*Zea mays*) and may contain not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

**Classes.** Corn shall be divided into the following three classes: Yellow Corn, White Corn, and Mixed Corn.

**Yellow Corn.** The class Yellow Corn shall be yellow-kerneled corn and may contain not more than 5.0 percent of corn of other colors. Yellow kernels of corn with a slight tinge of red shall be considered as yellow corn.

**White Corn.** The class White Corn shall be white-kerneled corn and may contain not more than 2.0 percent of corn of other colors. White kernels of corn with a slight tinge of light straw or pink color shall be considered as white corn.

**Mixed Corn.** The class Mixed Corn shall be corn which does not meet the color requirements for either of the classes Yellow Corn or White Corn and shall include white-capped yellow corn.

**Grades.** Grades shall be the numerical grades, sample grade, and special grades provided for on pages 18-20.

**Broken corn and foreign material.** Broken corn and foreign material shall be kernels and pieces of kernels of corn and all matter other than corn which will pass readily through a 12/64 sieve, and all matter other than corn which remains in the sieved sample.

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<sup>2</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.



**Damaged kernels.** Damaged kernels shall be kernels and pieces of kernels of corn which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, moldy, diseased, or otherwise materially damaged.

**Heat-damaged kernels.** Heat-damaged kernels shall be kernels and pieces of kernels of corn which have been materially discolored and damaged by heat.

**12/64 sieve.** A 12/64 sieve shall be an aluminum sieve 0.0319 inch thick perforated with round holes 0.1875 ( $1\frac{1}{64}$ ) inch in diameter which are  $\frac{1}{4}$  inch from center to center. The perforations of each row shall be staggered in relation to the adjacent row.

**Stones.** Stones shall be concreted earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water.

## **Principles governing the application of the standards**

The following principles shall apply in the determination of the classes and grades of corn:

**Basis of determination.** Each determination of class, damaged kernels, heat-damaged kernels, flint corn, and flint and dent corn shall be upon the basis of the grain after the removal of the broken corn and foreign material. All other determinations shall be upon the basis of the grain as a whole.

**Percentages.** All percentages shall be determined upon the basis of weight.

**Moisture.** Moisture shall be ascertained by the air-oven method for corn prescribed by the United States Department of Agriculture as described in Service and Regulatory Announcements No. 147 (1959 Revision), of the Agricultural Marketing Service, or ascertained by any method which gives equivalent results.

**Test weight per bushel.** Test weight per bushel shall be the weight per Winchester bushel as determined by the method prescribed by the United States Department of Agriculture as described in Circular No. 921, issued June 1953, or as determined by any method which gives equivalent results.

## Grades, grade requirements, and grade designations

The following grades, grade requirements, and grade designations are applicable under these standards:

### Corn

*Grades and grade requirements for the classes Yellow Corn, White Corn, and Mixed Corn.* (See also paragraphs on special grades, pages 19-20.)

Grade	Minimum test weight per bushel	Maximum limits of—			
		Moisture	Broken corn and foreign material	Damaged kernels	
				Total	Heat-damaged kernels
	<i>Pounds</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1-----	56	14.0	2.0	3.0	0.1
2-----	54	15.5	3.0	5.0	.2
3-----	52	17.5	4.0	7.0	.5
4-----	49	20.0	5.0	10.0	1.0
5-----	46	23.0	7.0	15.0	3.0
Sample grade....	Sample grade shall be corn which does not meet the requirements for any of the grades from No. 1 to No. 5, inclusive; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor; or which is otherwise of distinctly low quality.				

## Grade Designations

*Grade designations for all classes of corn.* The grade designation for corn shall include, in the order named, the number of the grade or the words "Sample grade," as the case may be; the name of the applicable class; and the name of each applicable special grade.

### Special grades for corn

#### *Flint corn*

**Requirements.** Flint corn shall be corn of any class which consists of 95 percent or more of flint corn.

**Grade designation.** Flint corn shall be graded and designated according to the grade requirements of the standards applicable to such corn if it were not flint, and there shall be added to and made a part of the grade designation, immediately following the class name, the word "Flint."

#### *Flint and dent corn*

**Requirements.** Flint and dent corn shall be corn of any class which consists of a mixture of flint and dent corn containing more than 5.0 percent but less than 95 percent of flint corn.

**Grade designation.** Flint and dent corn shall be graded and designated according to the grade requirements of the standards applicable to such corn if it were not flint and dent, and there shall be added to and made a part of the grade designation, immediately following the class name, the words "Flint and Dent" and the approximate percentage of flint corn.

*Weevily corn*

**Requirements.** Weevily corn shall be corn which is infested with live weevils or other insects injurious to stored grain.

**Grade designation.** Weevily corn shall be graded and designated according to the grade requirements of the standards applicable to such corn if it were not weevily, and there shall be added to and made a part of the grade designation the word "Weevily."

## STANDARDS FOR BARLEY<sup>3</sup>

### Terms defined

For the purposes of the Official Grain Standards of the United States for Barley:

**Barley.** Barley shall be any grain which, before the removal of dockage, consists of 50 percent or more of barley, and may contain not more than 25 percent of other grains for which standards have been established under the United States Grain Standards Act. The term "barley" as used in these standards shall not include hull-less barley.

**Classes.** Barley shall be divided into the following three classes: Barley, Western Barley, and Mixed Barley.

**Barley.** The class Barley shall be any barley with white hulls grown east of the Rocky Mountains and may include not more than 10 percent of black barley or of barley of the class Western Barley, either singly or in any combination. This class shall be divided into the following three subclasses:

(1) *Malting Barley.* This subclass shall be six-rowed barley of the class Barley which has 90 percent or more of the kernels with white aleurone layers; which is not semisteely in mass; which after the removal of dockage, contains not more than 5 percent of two-rowed and/or other types or varieties of barley of unsuitable malting type such as Trebi, 4.0 percent damaged kernels, 3.0 percent foreign material, 10.0 percent skinned and broken kernels, 15 percent thin barley, 2.0 percent black barley, and 5.0 percent other grains; which has a minimum test weight per bushel of 43 pounds; which contains a minimum

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<sup>3</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.



of 90 percent sound barley; which does not contain barley injured by frost or heat; and which is not smutty, garlicky, weevily, ergoty, or bleached; and which otherwise meets the requirements of grades Nos. 1 to 3, inclusive, of the subclass Barley.

(2) *Blue Malting Barley.* This subclass shall be six-rowed barley of the class Barley which has 90 percent or more of the kernels with blue aleurone layers, and which otherwise meets the requirements of the subclass Malting Barley.

(3) *Barley.* The subclass Barley shall be any barley of the class Barley which does not meet the requirements of the subclass Malting Barley, or Blue Malting Barley.

**Western Barley.** This class shall be any barley with white hulls grown west of the Great Plains area of the United States and may include not more than 10 percent of black barley or of barley of the class Barley, either singly or in any combination.

**Mixed Barley.** This class shall be any mixture of barley which does not meet the requirements of the classes Barley or Western Barley. Black barley shall be classified as Mixed Barley.

**Grades.** Grades shall be the numerical grades, Sample grade, and special grades provided for on pages 26-34.

**Dockage.** Dockage shall be weed seeds, weed stems, chaff, straw, grain other than barley, sand, dirt, and any material other than barley which can be removed readily from the barley by the use of appropriate sieves and cleaning devices; also underdeveloped, shriveled, and small pieces of barley kernels removed in properly separating the material other than barley and which cannot be recovered by properly rescreening or recleaning.

**Sound barley.** Sound barley shall be kernels and pieces of kernels of barley remaining after the removal of dockage, which are not damaged or materially discolored by blight and/or mold, which are not heat damaged, sprouted, malted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged.

**Damaged kernels.** Damaged kernels shall be kernels and pieces of kernels of barley, other grains, and wild oats which are damaged or materially discolored by blight and/or mold, or which are heat damaged, sprouted, malted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged.

**Heat-damaged kernels.** Heat-damaged kernels shall be kernels and pieces of kernels of barley, other grains, and wild oats, which have been materially discolored and damaged by heat.

**Foreign material.** Foreign material shall be all matter other than barley, other grains, and wild oats, which is not separated from the barley in the proper determination of dockage.

**Other grains.** Other grains shall be wheat, rye, oats, corn, grain sorghums, hull-less barley, flaxseed, emmer, spelt, einkorn, Polish wheat, poulard wheat, cultivated buckwheat, and soybeans.

**Wild oats.** Wild oats shall be seeds of *Avena fatua* and *A. sterilis*.

**Wild brome grasses.** Wild brome grasses shall be the seeds of brome grasses such as *Bromus rigidus* which have harsh awns and which are injurious when fed to livestock.

**Broken kernels.** Broken kernels shall be pieces of barley kernels.

**Skinned kernels.** Skinned kernels shall be any barley kernels from which one-third or more of the hull has been removed, or which has the hull loosened or removed over the germ.

**Black barley.** Black barley shall be barley with black hulls.



**Thin barley.** (1) Thin barley in the class Barley shall be barley and other matter that will pass readily through a  $\frac{5}{64} \times \frac{3}{4}$  sieve.

(2) Thin barley in the class Western Barley shall be barley and other matter that will pass readily through a  $5\frac{1}{2}/64 \times \frac{3}{4}$  sieve.

**Stones.** Stones shall be concreted earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water.

**$5/64$  by  $\frac{3}{4}$  sieve.** A  $\frac{5}{64}$  by  $\frac{3}{4}$  sieve shall be a metal sieve 0.032 inch thick perforated with slotted perforations  $0.0781 (\frac{5}{64})$  by  $0.750 (\frac{3}{4})$  inch with approximately 865 perforations per square foot.

**$5\frac{1}{2}/64$  by  $\frac{3}{4}$  sieve.** A  $5\frac{1}{2}/64 \times \frac{3}{4}$  sieve shall be a metal sieve 0.032 inch thick perforated with slotted perforations  $0.0858 (5\frac{1}{2}/64)$  inch by  $0.750 (\frac{3}{4})$  inch with approximately 856 perforations per square foot.

## Principles governing the application of the standards

The following principles shall apply in the determination of the classes and grades of barley:

**Basis of determination.** Each determination of dockage, temperature, odor, garlic, live weevils or other insects injurious to stored grain, and distinctly low quality shall be upon the basis of the grain as a whole. Each determination of heat-damaged kernels and of white aleurone layers in Malting Barley and blue aleurone layers in Blue Malting Barley shall be upon the basis of the pearled dockage-free grain. All other determinations shall be upon the basis of the grain when free from dockage.

**Percentages.** All percentages shall be upon the basis of weight.

**Moisture.** Moisture shall be ascertained by the air-oven method prescribed by the United States Department of Agriculture, as described in Service and Regulatory Announcement No.

147, issued by the Agricultural Marketing Service, or ascertained by any method which gives equivalent results.

**Test weight per bushel.** Test weight per bushel shall be the weight per Winchester bushel as determined by the method prescribed by the United States Department of Agriculture, as described in Circular 921 issued June 1953, or as determined by any method which gives equivalent results.

### **Grades, grade requirements, and grade designations**

The following grades, grade requirements, and grade designations are applicable under these standards:

## Barley

*Grades and grade requirements for the subclass Barley of the class Barley. (See also paragraphs on special grades, pages 29-34.)*

Grade	Minimum limits of—		Maximum limits of—				
	Test weight per bushel	Sound barley	Total damaged kernels	Heat damaged kernels	Foreign material	Broken kernels	Thin barley
	Pounds	Percent	Percent	Percent	Percent	Percent	Percent
1	47	97	2.0	0.2	1.0	5.0	10.0
2	45	94	4.0	.3	2.0	10.0	15.0
3	43	90	6.0	.5	3.0	15.0	25.0
4	40	80	8.0	1.0	4.0	20.0	35.0
5	36	70	10.0	3.0	6.0	30.0	75.0
Sample grade	Sample grade shall include barley of the class Barley, which does not come within the grade requirements of any of the grades from No. 1 to No. 5, inclusive; or which contains more than 16.0 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.						

<sup>1</sup> Barley that is badly stained or materially weathered, shall not be graded higher than No. 4.

# Barley (Malting Barley and Blue Malting Barley)

*Grades and grade requirements for the subclasses Malting Barley and Blue Malting Barley of the class Barley. (See also paragraphs on special grades, pages 29-34.)*

Grade	Minimum limits of—		Maximum limits of—				
	Test weight per bushel	Sound barley	Damaged kernels	Foreign material	Skinned and broken kernels	Thin barley	Black barley
	Pounds	Percent	Percent	Percent	Percent	Percent	Percent
1-----	47	97	2.0	1.0	4.0	7.0	0.5
2-----	45	94	3.0	2.0	7.0	10.0	1.0
3-----	43	90	4.0	3.0	10.0	15.0	2.0

NOTE: Barley of the class Barley which does not meet the requirements of any of the grades 1 to 3, inclusive, for the subclasses Malting Barley and Blue Malting Barley shall be classified and graded according to the grade requirements for the subclass Barley.

### Western Barley

*Grades and grade requirements for Western Barley.*  
(See also paragraphs on special grades, pages 29-34.)

Grade	Minimum limits of sound barley	Maximum limits of—				
		Heat-damaged kernels (barley, other grains, and wild oats)	Wild oats	For material	Broken kernels	Black barley
	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
1.....	98	0.1	1.0	0.5	3.0	0.5
2.....	96	.2	2.0	1.0	6.0	1.0
3.....	93	.3	3.0	2.0	10.0	2.0
4.....	88	.5	5.0	3.0	15.0	5.0
5.....	80	1.0	10.0	4.0	25.0	10.0
Sample grade..	Sample grade shall include barley of the class Western Barley which does not come within the grade requirements of any of the grades from No. 1 to No. 5, inclusive; or which contains more than 15 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which contains the seeds of wild brome grasses of a character and in a quantity sufficient to cause the grain to be of low quality for feeding purposes; or which is otherwise of distinctly low quality.					

### Mixed Barley

*Grades and grade requirements for the class Mixed Barley.* The class Mixed Barley shall be graded according to the grade requirements of the class of Barley which predominates in the mixture. If black barley predominates the grade requirements for the subclass barley of the class Barley shall be used.



### Grade Designation

The grade designation for barley shall include the number of the grade or the words "Sample grade," as the case may be; the name of the class or subclass; the name of each applicable special grade; and the word "dockage" together with the percentage thereof. In the case of the class Mixed Barley, the grade designation shall also include, following the name of the class, the approximate percentage of Barley, Western Barley, and black barley in the mixture.

### Dockage

The quantity of dockage shall be calculated in terms of percentage based on the total weight of the grain including the dockage. Dockage shall be stated in terms of whole percent and any fraction of a percent shall be disregarded.

### Special Grades for Barley

#### *Test weight of Western Barley*

For barley of the class Western Barley, the test weight per bushel in terms of whole pounds shall be added to, and made a part of, the grade designation, following the name of the class. A fraction of a pound shall be disregarded.

#### *Tough barley*

**Requirements.** Tough barley shall be (a) barley of the class Barley which contains more than 14.5 percent but not more than 16 percent of moisture and (b) barley of the class Western Barley which contains more than 13.5 percent but not more than 15 percent of moisture.

**Grade designation.** Tough barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not tough, and there shall be added to, and made a part of, the grade designation, the word "Tough."

*Two-rowed Barley*

**Requirements.** Two-rowed Barley shall consist of two-rowed barley of the class Barley, or of the class Western Barley, which does not meet the requirements for the special grades Choice Malting Two-rowed Western Barley, and Malting Two-rowed Western Barley, and may contain not more than 10 percent of six-rowed barley.

**Grade designation.** Two-rowed Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not two-rowed, and there shall be added to, and made a part of, the grade designation, preceding the name of the class, the word "Two-rowed."

*Choice Malting Two-rowed Western Barley*

**Requirements.** Choice Malting Two-rowed Western Barley shall be two-rowed Barley of the class Western Barley which consists of the Hannchen or Hanna varietal types; which contains not more than 3 percent of varietal types of barley other than Hannchen or Hanna; which meets the requirements for grade No. 1 except that the limitations on seeds of wild brome grasses shall be disregarded; which has a test weight per bushel of 52 pounds or more; which contains 90 percent or more of mellow kernels; which is not semisteely in mass; which contains not more than 5 percent of thin barley; which contains not more than 5 percent of skinned and/or broken kernels; which does not contain barley injured by frost, by heat, or by mold; and shall not include barley of the special grades stained, smutty, garlicky, weevily, ergoty, or bleached.

**Grade designation.** Choice Malting Two-rowed Western Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it



were not Choice Malting Two-rowed, and there shall be added to, and made a part of, the grade designation, preceding the name of the class, the words, "Choice Malting Two-rowed."

*Malting Two-rowed Western Barley*

**Requirements.** Malting Two-rowed Western Barley shall be Two-rowed Barley of the class Western Barley which consists of the Hannchen or Hanna varietal types; which contains not more than 5 percent of varietal types of barley other than Hannchen or Hanna; which meets the requirements for any of the grades No. 1 to No. 3, inclusive, except that the limitation on seeds of wild brome grasses shall be disregarded; which does not meet the requirements for the special grade Choice Malting Two-rowed Western Barley; which has a test weight per bushel of 50 pounds or more; which contains 70 percent or more of mellow kernels; which is not semisteely in mass; which contains not more than 10 percent of thin barley; which contains not more than 10 percent of skinned and/or broken kernels; which does not contain barley injured by frost, by heat, or by mold; and shall not include barley of the special grades stained, blighted, smutty, garlicky, weevily, ergoty, or bleached: *Provided*, That Malting Two-rowed Western Barley of the grade No. 1 shall contain not less than 80 percent of mellow kernels; and may contain not more than 3 percent of varietal types of barley other than Hannchen or Hanna, not more than 7 percent of thin barley, and not more than 7 percent of skinned and/or broken kernels.

**Grade designation.** Malting Two-rowed Western Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not Malting Two-rowed, and there shall be added to, and made a part of, the grade designation, preceding the name of the class, the words "Malting Two-rowed."

*Bright Western Barley*

**Requirements.** Bright Western Barley shall be barley of the class Western Barley, except Bleached Barley, that is of good natural color.

**Grade designation.** Bright Western Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not bright, and there shall be added to, and made a part of, the grade designation, preceding the name of the class, the word "Bright."

*Stained Western Barley*

**Requirements.** Stained Western Barley shall be barley of the class Western Barley, except Bleached Barley, that is badly stained or weathered.

**Grade designation.** Stained Western Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not stained, and there shall be added to, and made a part of, the grade designation, the word "Stained."

*Blighted Barley*

**Requirements.** Blighted Barley shall be barley which contains more than 4 percent of barley damaged or materially discolored by blight and/or mold.

**Grade designation.** Blighted Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not blighted, and there shall be added to, and made a part of, the grade designation, the word "Blighted."

*Smutty Barley*

**Requirements.** Smutty Barley shall be barley which has the kernels covered with smut spores, or which contains smut masses in excess of 0.2 percent.

**Grade designation.** Smutty Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not smutty, and there shall be added to, and made a part of, the grade designation, the word "Smutty."

*Garlicky Barley*

**Requirements.** Garlicky Barley shall be barley which contains 3 or more green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 500 grams of barley.

**Grade designation.** Garlicky Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not garlicky, and there shall be added to, and made a part of, the grade designation, the word "Garlicky."

*Weevily Barley*

**Requirements.** Weevily Barley shall be barley which is infested with live weevils or other insects injurious to stored grain.

**Grade designation.** Weevily Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not weevily, and there shall be added to, and made a part of, the grade designation, the word "Weevily."

*Ergoty Barley*

**Requirements.** Ergoty Barley shall be barley which contains ergot in excess of 0.3 percent.

**Grade designation.** Ergoty Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not ergoty, and there shall be added to, and made a part of, the grade designation, the word "Ergoty."

*Bleached Barley*

**Requirements.** Bleached Barley shall be barley which, in whole, or in part, has been treated by the use of sulphurous acid or any other bleaching agent.

**Grade designation.** Bleached Barley shall be graded and designated according to the grade requirements of the standards applicable to such barley if it were not bleached, and there shall be added to, and made a part of, the grade designation, the word "Bleached."

## STANDARDS FOR OATS <sup>4</sup>

### Terms defined

For the purposes of the Official Grain Standards of the United States for Oats:

**Oats.** Oats shall be any grain which consists of 50 percent or more of cultivated oats (*Avena sativa* and/or *A. byzantina*) and may contain not more than 25 percent of wild oats and other grains for which standards have been established under the United States Grain Standards Act, singly or in combination.

**Classes.** Oats shall be divided into the following five classes: White oats, Red oats, Gray oats, Black oats, and Mixed oats.

**White oats.** The class White oats shall be common oats with the color and other physical characteristics of the white and or yellow oats types and may contain not more than 10.0 percent of oats of other types.

**Red oats.** The class Red oats shall be oats with the color and other physical characteristics of the red oats type and may contain not more than 10.0 percent of oats of other types.

**Gray oats.** The class Gray oats shall be oats with the color and other physical characteristics of the gray oats type and may contain not more than 10.0 percent of oats of other types.

**Black oats.** The class Black oats shall be oats with the color and other physical characteristics of the black oats type and may contain not more than 10.0 percent of oats of other types.

**Mixed oats.** The class Mixed oats shall include all mixtures of oats not provided for in the classes White oats, Red oats, Gray oats, and Black oats.

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<sup>4</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.



**Grades.** Grades shall be the numerical grades, sample grade, and special grades provided for on pages 37-41.

**Foreign material.** Foreign material shall be all matter except cultivated oats, other grains, and wild oats, and shall include oat clippings and detached oat hulls.

**Other grains.** Other grains shall be wheat, rye, corn, grain sorghums, barley, hull-less barley, flaxseed, emmer, spelt, einkorn, Polish wheat, poulard wheat, cultivated buckwheat, and soybeans.

**Sound cultivated oats.** Sound cultivated oats shall be all cultivated oats which are not heat-damaged, sprouted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged.

**Heat-damaged kernels.** Heat-damaged kernels shall be kernels and pieces of kernels of cultivated oats, other grains, and wild oats which have been materially discolored and damaged by heat.

**Fine seeds.** Fine seeds shall be all matter which will pass readily through a  $5/64$  triangular hole sieve.

**Wild oats.** Wild oats shall be the seeds of *Avena fatua* and *A sterilis*.

**Stones.** Stones shall be concreted earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water.

**$5/64$  triangular hole sieve.** A  $5/64$  triangular hole sieve shall be an aluminum sieve 0.0319 inch thick with equilateral triangular perforations the inscribed circles of which are 0.0781 ( $5/64$ ) inch in diameter and which are  $1/4$  inch from center to center. The perforations of each row shall be staggered in relation to the adjacent row.

**0.064 x  $3/8$  sieve.** A 0.064 x  $3/8$  sieve shall be an aluminum sieve 0.0319 inch thick perforated with oblong holes 0.064 inch by 0.375 ( $3/8$ ) inch,

which are 0.125 ( $\frac{1}{8}$ ) inch from center to center and which have 0.0525 inch end bridges. The perforations of each row shall be end staggered in relation to the adjacent row.

## **Principles governing application of standards**

The following principles shall apply in the determination of the classes and grades of oats:

**Basis of determination.** All determinations shall be on the basis of the grain as a whole.

**Percentages.** All percentages shall be determined upon the basis of weight.

**Moisture.** Moisture shall be ascertained by the air-oven method for oats prescribed by the United States Department of Agriculture, as described in Service and Regulatory Announcements No. 147, issued by the Agricultural Marketing Service, or ascertained by any method which gives equivalent results.

**Test weight per bushel.** Test weight per bushel shall be the weight per Winchester bushel as determined by the method prescribed by the United States Department of Agriculture, as described in Circular No. 921, issued June 1953, or as determined by any method which gives equivalent results.

## **Grades, grade requirements, and grade designations**

The following grades, grade requirements, and grade designations are applicable under these standards:

## Oats

*Grades and grade requirements for the classes White oats, Red oats, Gray oats, Black oats, and Mixed oats. (See also paragraphs on special grades, pages 39-41.)*

Grade	Minimum limits of—		Maximum limits of—		
	Test weight per bushel	Sound cultivated oats	Heat-damaged kernels	Foreign material	Wild oats
	<i>Pounds</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1 <sup>1</sup> -----	34	97	0.1	2.0	2.0
2 <sup>2</sup> -----	32	94	.3	3.0	3.0
3 <sup>3</sup> -----	30	90	1.0	4.0	5.0
4 <sup>4</sup> -----	27	80	3.0	5.0	10.0
Sample grade---	Sample grade shall be oats which do not meet the requirements for any of the grades No. 1 to No. 4, inclusive; or which contain more than 16.0 percent of moisture; or which contain stones; or which are musty, or sour, or heating; or which have any commercially objectionable foreign odor except of smut or garlic; or which are otherwise of distinctly low quality.				

<sup>1</sup> The oats in grades No. 1 White oats may contain not more than 5.0 percent of red oats, gray oats, and black oats, singly or in combination, of which not more than 2.0 percent may be black oats.

<sup>2</sup> The oats in grade No. 2 White oats may contain not more than 3.0 percent of black oats.

<sup>3</sup> Oats that are slightly weathered shall be graded not higher than No. 3.

<sup>4</sup> Oats that are badly stained or materially weathered shall be graded not higher than No. 4.

## Grade Designations

*Grade designation for all classes of oats.* The grade designation for oats shall include the number of the grade or the words "Sample grade," as the case may be; the name of the applicable class; and the name of each applicable special grade.

## Special grades for oats

### *Bright oats*

**Requirements.** Bright oats shall be oats, except Bleached oats, that are of good, natural color.

**Grade designation.** Bright oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not bright, and there shall be added to and made a part of the grade designation, preceding the name of the class, the word "Bright."

### *Heavy oats*

**Requirements.** Heavy oats shall be oats which have a test weight per bushel of 36 pounds or more but less than 38 pounds.

**Grade designation.** Heavy oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not heavy, and there shall be added to and made a part of the grade designation, preceding the name of the class, the word "Heavy."

### *Extra heavy oats*

**Requirements.** Extra heavy oats shall be oats which have a test weight per bushel of 38 pounds or more.

**Grade designation.** Extra heavy oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not extra heavy, and there shall be added to and made a part of the grade designation, preceding the name of the class, the words "Extra Heavy."

*Tough oats*

**Requirements.** Tough oats shall be oats which contain more than 14.0 percent but not more than 16.0 percent of moisture.

**Grade designation.** Tough oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not tough, and there shall be added to and made a part of the grade designation the word "Tough."

*Thin oats*

**Requirements.** Thin oats shall be oats which contain more than 20.0 percent of oats and/or other matter, except "fine seeds," that will pass readily through a  $0.064 \times \frac{3}{8}$  sieve.

**Grade designation.** Thin oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not thin, and there shall be added to and made a part of the grade designation the word "Thin."

*Weevily oats*

**Requirements.** Weevily oats shall be oats which are infested with live weevils or other insects injurious to stored grain.

**Grade designation.** Weevily oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not weevily, and there shall be added to and made a part of the grade designation the word "Weevily."

*Smutty oats*

**Requirements.** Smutty oats shall be oats which have the kernels covered with smut spores or which contain smut masses and/or smut balls in excess of 0.2 percent.



**Grade designation.** Smutty oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not smutty, and there shall be added to and made a part of the grade designation the word "Smutty."

### *Ergoty oats*

**Requirements.** Ergoty oats shall be oats which contain ergot in excess of 0.3 percent.

**Grade designation.** Ergoty oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not ergoty, and there shall be added to and made a part of the grade designation the word "Ergoty."

### *Garlicky oats*

**Requirements.** Garlicky oats shall be oats which contain 4 or more green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 500 grams of oats.

**Grade designation.** Garlicky oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not garlicky, and there shall be added to and made a part of the grade designation the word "Garlicky."

### *Bleached oats*

**Requirements.** Bleached oats shall be oats which in whole or in part, have been treated by the use of sulphurous acid or any other bleaching agent.

**Grade designation.** Bleached oats shall be graded and designated according to the grade requirements of the standards applicable to such oats if they were not bleached, and there shall be added to and made a part of the grade designation the word "Bleached."

## STANDARDS FOR RYE<sup>7</sup>

For the purposes of the official grain standards of the United States for rye:

**Rye.**—Rye shall be any grain which, before the removal of dockage, consists of 50 percent or more of rye and not more than 10 percent of other grains for which standards have been established under the provisions of the United States Grain Standards Act.

**Grades.**—Rye shall be graded and designated according to the respective grade requirements of the numerical grades and Sample grade of these standards, and according to the special grades when applicable.

### Dockage

Dockage includes weed seeds, weed stems, chaff, straw, grain other than rye, sand, dirt, and any other foreign material, which can be removed readily from the rye by the use of appropriate sieves and cleaning devices; also undeveloped, shriveled, and small pieces of rye kernels which are removed in properly separating the foreign material, and which cannot be recovered by properly rescreening or recleaning.

The quantity of dockage shall be calculated in terms of percentage based on the total weight of the grain including the dockage. The percentage of dockage so calculated, when equal to 1 percent or more, shall be stated in terms of whole percent, and when less than 1 percent shall not be stated. A fraction of a percent shall be disregarded. The word "Dockage", together with the percentage thereof, shall be added to the grade designation.

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<sup>7</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

**Rye***Grade requirements for Rye*

Grade No.	Mini- mum test weight per bushel	Maximum limits of—			
		Damaged kernels (rye and other grains)		Foreign material	
		Total	Heat- dam- aged	Total	Foreign matter other than wheat
	<i>Pounds</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1 <sup>1</sup> -----	56	2	0.1	3	1
2 <sup>1</sup> -----	54	4	.2	6	2
3 <sup>1</sup> -----	52	7	.5	10	4
4-----	49	15	3.0	10	6
Sample grade..	Sample grade shall include rye which does not come within the requirements of any of the grades from No. 1 to No. 4, inclusive; or which contains more than 16 percent of moisture; or which contains inseparable stones and/or cinders; or which is musty, or sour, or heating, or hot; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of distinctly low quality.				

<sup>1</sup> The rye in grade No. 1 may contain not more than 10.0 percent, in grade No. 2 not more than 15.0 percent, and in grade No. 3 not more than 25.0 percent of "thin" rye, which "thin" rye shall consist of rye and other matter that will pass readily through a sieve 0.032 inch thick with perforations 0.064 by 0.375 inch.

## Special Grades for Rye

### *Plump Rye*

**Definition.**—Plump rye shall be rye which does not contain more than 5 percent of rye and other matter that will pass through a 20-gage metal sieve with rectangular perforations 0.064 inch wide by  $\frac{3}{8}$  inch long.

**Grades.**—Plump rye shall be graded and designated according to the grade requirements of the standards applicable to such rye if it were not plump, and there shall be added to, and made a part of, the grade designation, immediately preceding the word rye, the word "Plump."

### *Tough Rye*

**Definition.**—Tough rye shall be rye which contains more than 14 percent but not more than 16 percent of moisture.

**Grades.**—Tough rye shall be graded and designated according to the grade requirements of the standards applicable to such rye if it were not tough, and there shall be added to, and made a part of, the grade designation, the word "Tough."

### *Smutty Rye*

**Definition.**—Smutty rye shall be rye which has an unmistakable odor of smut, or which contains balls, portions of balls, or spores, of smut, in excess of a quantity equal to 14 balls of average size in 250 grams of rye.

**Grades.**—Smutty rye shall be graded and designated according to the grade requirements of the standards applicable to such rye if it were not smutty; and

(1) In the case of smutty rye which has an unmistakable odor of smut, or which contains balls, portions of balls, or spores, of smut, in excess of a quantity equal to 14 balls but not in excess of a quantity equal to 30 balls of aver-

age size in 250 grams of rye, there shall be added to, and made a part of, the grade designation, the words "Light Smutty"; and

(2) In the case of smutty rye which contains balls, portions of balls, or spores, of smut, in excess of a quantity equal to 30 balls of average size in 250 grams of rye, there shall be added to, and made a part of, the grade designation, the word "Smutty."

### *Garlicky Rye*

**Definition.**—Garlicky rye shall be rye which contains 2 or more green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 1,000 grams of rye.

**Grades.**—Garlicky rye shall be graded and designated according to the grade requirements of the standards applicable to such rye if it were not garlicky; and

(1) In the case of garlicky rye which contains 2 or more but not more than 6 green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 1,000 grams of rye, there shall be added to, and made a part of, the grade designation, the words "Light Garlicky"; and

(2) In the case of garlicky rye which contains more than 6 green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 1,000 grams of rye, there shall be added to, and made a part of, the grade designation, the word "Garlicky."

### *Weevily Rye*

**Definition.**—Weevily rye shall be rye which is infested with live weevils or other insects injurious to stored grain.

**Grades.**—Weevily rye shall be graded and designated according to the grade requirements of the standards applicable to such rye if it were not weevily, and there shall be added to, and made a part of, the grade designation, the word "Weevily."



*Ergoty Rye*

**Definition.**—Ergoty rye shall be rye which contains ergot in excess of 0.3 percent.

**Grades.**—Ergoty rye shall be graded and designated according to the grade requirements of the standards applicable to such rye if it were not ergoty, and there shall be added to, and made a part of, the grade designation, the word "Ergoty."

**Definitions**

**Basis of grade determinations.**—Each determination of dockage, temperature, odor, garlic, and live weevils or other insects injurious to stored grain, shall be upon the basis of the grain as a whole. All other determinations shall be upon the basis of the grain when free from dockage.

**Percentages.**—Percentages, except in the case of moisture, shall be percentages ascertained by weight.

**Percentage of moisture.**—Percentage of moisture shall be that ascertained by the air oven and the method of use thereof described in Service and Regulatory Announcements No. 147 of the Agricultural Marketing Service of the United States Department of Agriculture, or ascertained by any device and method which give equivalent results in the determination of moisture.

**Test weight per bushel.**—Test weight per bushel shall be the weight per Winchester bushel as determined by the testing apparatus and the method of use thereof described in Bulletin No. 1065, dated May 18, 1922, issued by the United States Department of Agriculture, or as determined by any device and method which give equivalent results in the determination of test weight per bushel.

**Foreign material.**—Foreign material shall include all matter other than rye which is not separated from the rye in the proper determination of dockage, except that smut balls shall not be considered as foreign material.

**Other grains.**—Other grains shall include wheat, oats, corn, grain sorghums, barley, hull-less barley, flaxseed, emmer, spelt, einkorn, Polish wheat, poulard wheat, cultivated buckwheat, and soybeans.

**Damaged kernels.**—Damaged kernels shall be kernels and pieces of kernels of rye and other grains which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged.

**Heat-damaged kernels.**—Heat-damaged kernels shall be kernels and pieces of kernels of rye and other grains which have been materially discolored and damaged by external heat or as a result of heating caused by fermentation.

## STANDARDS FOR GRAIN SORGHUMS<sup>8</sup>

For the purposes of the official grain standards of the United States for grain sorghums:

**Grain sorghums.**—Grain sorghums shall be any grain which, before the removal of dockage, consists of 50 percent or more of grain sorghums and not more than 10 percent of other grains for which standards have been established under the provisions of the United States Grain Standards Act, and which, after the removal of dockage and of “cracked kernels, foreign material, and other grains”, contains not more than 25 percent of nongrain sorghums.

**Classes.**—Grain sorghums shall be divided into five classes, as follows: Class I, White Grain Sorghums; Class II, Yellow Grain Sorghums; Class III, Red Grain Sorghums; Class IV, Brown Grain Sorghums; and Class V, Mixed Grain Sorghums.

**Grades.**—Grain sorghums shall be graded and designated according to the respective grade requirements of the numerical grades and Sample grade of their appropriate class or subclass, and according to the special grades when applicable.

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<sup>8</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

# Grain Sorghums

## Grade requirements for Grain Sorghums

Grade No.	Maximum limits of—				
	Minimum test weight per bushel	Moisture	Damaged kernels (grain sorghums, nongrain sorghums, and other grains)		Total cracked kernels, foreign material, and other grains
			Total	Heat-damaged	
1-----	Pounds 55	Percent 14	Percent 2	Percent 0.2	Percent 4
2-----	53	15	5	.5	8
3-----	51	16	10	1.0	12
4-----	49	18	15	3.0	15
Sample grade-----	Sample grade shall include grain sorghums of any class or subclass which do not come within the requirements of any of the grades from No. 1 to No. 4, inclusive; or which contain inseparable stones and/or cinders; or which are musty, or sour, or heating, or hot; or which are badly weathered; or which have any commercially objectionable foreign odor except of smut; or which are otherwise of distinctly low quality.				

### **White Grain Sorghums (Class I)**

This class shall include all varieties of white grain sorghums, and may include not more than 10 percent of grain sorghums of other colors. Colored spots upon kernels that are otherwise white shall not affect their classification as white. This class shall be divided into three subclasses, as follows:

#### *Subclass (A) White Kafir*

This subclass shall include grain sorghums of the white kafir type, including hegari, and may include not more than 10 percent of other white grain sorghums, grain sorghums of other colors, or nongrain sorghums of other colors, singly or in any combination.

#### *Subclass (B) White Durra*

This subclass shall include grain sorghums of the white durra type, and may include not more than 10 percent of other white grain sorghums, grain sorghums of other colors, or nongrain sorghums of other colors, singly or in any combination.

#### *Subclass (C) White Grain Sorghums*

This subclass shall include all grain sorghums of the class White Grain Sorghums not coming within the classification for subclass (a) White Kafir or subclass (b) White Durra.

### **Yellow Grain Sorghums (Class II)**

This class shall include all varieties of yellow and salmon-pink grain sorghums, and may include not more than 10 percent of grain sorghums of other colors. This class shall be divided into two subclasses, as follows:



*Subclass (A) Yellow Milo*

This subclass shall include grain sorghums of the yellow milo type, and may include not more than 10 percent of other yellow grain sorghums, grain sorghums of other colors, or nongrain sorghums of other colors, singly or in any combination.

*Subclass (B) Yellow Grain Sorghums*

This subclass shall include all grain sorghums of the class Yellow Grain Sorghums not coming within the classification for subclass (a) Yellow Milo.

**Red Grain Sorghums (Class III)**

This class shall include all varieties of red grain sorghums, and may include not more than 10 percent of grain sorghums of other colors. This class shall be divided into two subclasses, as follows:

*Subclass (A) Red Kafir*

This subclass shall include grain sorghums of the red kafir type and may include not more than 10 percent of other red grain sorghums, grain sorghums of other colors, or nongrain sorghums of other colors, singly or in any combination.

*Subclass (B) Red Grain Sorghums*

This subclass shall include all grain sorghums of the class Red Grain Sorghums not coming within the classification for subclass (a) Red Kafir.

### **Brown Grain Sorghums (Class IV)**

This class shall include all varieties of brown grain sorghums, and may include not more than 10 percent of grain sorghums of other colors.

### **Mixed Grain Sorghums (Class V)**

This class shall include all mixtures of grain sorghums not provided for in the classes from I to IV, inclusive.

**Grade requirements and designations.**—The grade designation for Mixed Grain Sorghums shall include, successively, in the order named: (1) The number of the grade or the words "Sample grade", as the case may be; (2) the words "Mixed Grain Sorghums"; (3) the name and the approximate percentage of each class of grain sorghums which constitutes 10 percent or more of the mixture, in the order of its predominance, but if only one class exceeds 10 percent of the mixture, the name and approximate percentage of that class shall be included in the grade designation, followed by the name and approximate percentage of at least one other class. In those cases where Mixed Grain Sorghums consist of 70 percent or more of grain sorghums of the types white kafir, white durra, yellow milo, or red kafir, singly or combined, and not more than 10 percent of brown grain sorghums, the word "Mixed" shall be substituted for the words "Mixed Grain Sorghums", and the name of the appropriate subclass or subclasses for such type or types, as the case may be, shall be substituted for the class names, in the grade designation.

### Dockage

Dockage includes sand, dirt, finely broken kernels, weed seeds, and other foreign material, which can be removed readily from the grain sorghums by means of a metal sieve perforated with round holes  $2\frac{1}{2}/64$  inch in diameter. The quantity of dockage shall be calculated in terms of percentage based on the total weight of the grain including the dockage.

Dockage shall be stated in terms of whole percent. A fraction of a percent shall be disregarded. The word "Dockage", together with the percentage thereof, shall be added to the grade designation.

### Special Grades for Grain Sorghums

#### *Bright Grain Sorghums*

**Definition.**—Bright grain sorghums shall be grain sorghums, of any class or subclass, which have good, natural color.

**Grades.**—Bright grain sorghums shall be graded and designated according to the grade requirements of the standards applicable to such grain sorghums if they were not bright, and there shall be added to, and made a part of, the grade designation, preceding the name of the class or subclass, the word "Bright."

*Discolored Grain Sorghums*

**Definition.**—Discolored grain sorghums shall be grain sorghums of any class or subclass which are discolored, but which are not badly weathered.

**Grades.**—Discolored grain sorghums shall be graded and designated according to the grade requirements of the standards applicable to such grain sorghums if they were not discolored, and there shall be added to, and made a part of, the grade designation, the word “Discolored.”

*Weevily Grain Sorghums*

**Definition.**—Weevily grain sorghums shall be grain sorghums which are infested with live weevils or other insects injurious to stored grain.

**Grades.**—Weevily grain sorghums shall be graded and designated according to the grade requirements of the standards applicable to such grain sorghums if they were not weevily, and there shall be added to, and made a part of, the grade designation, the word “Weevily.”

*Smutty Grain Sorghums*

**Definition.**—Smutty grain sorghums shall be grain sorghums which have the kernels covered with smut spores, or which contain a quantity of smut masses in excess of a quantity equal to 10 masses in 50 grams of grain sorghums.

**Grades.**—Smutty grain sorghums shall be graded and designated according to the grade requirements of the standards applicable to such grain sorghums if they were not smutty, and there shall be added to, and made a part of, the grade designation, the word “Smutty.”

## Definitions

**Basis of grade determinations.**—Each determination of “cracked kernels, foreign material, and other grains”, shall be upon the basis of the grain when free from dockage. Each determination of class, subclass, nongrain sorghums, damage, heat damage, and inseparable stones and/or cinders, shall be upon the basis of the grain when free from dockage and when free from that part of the “cracked kernels, foreign material, and other grains” which can be removed readily by the use of a metal sieve perforated with equilateral triangular perforations the inscribed circles of which are  $5/64$  inch in diameter. All other determinations shall be upon the basis of the grain as a whole.

**Percentages.**—Percentages, except in the case of moisture, shall be percentages ascertained by weight.

**Percentage of moisture.**—Percentage of moisture shall be that ascertained by the air oven and the method of use thereof described in Service and Regulatory Announcements No. 147 of the Agricultural Marketing Service of the United States Department of Agriculture, or ascertained by any device and method which give equivalent results in the determination of moisture.

**Test weight per bushel.**—Test weight per bushel shall be the weight per Winchester bushel as determined by the testing apparatus and the method of use thereof described in Bulletin No. 1065, dated May 18, 1922, issued by the United States Department of Agriculture, or as determined by any device and method which give equivalent results in the determination of test weight per bushel.



**Other grains.**—Other grains shall include wheat, rye, oats, corn, barley, hull-less barley, flaxseed, emmer, spelt, einkorn, Polish wheat, poulard wheat, cultivated buckwheat, and soybeans.

**Nongrain sorghums.**—Nongrain sorghums shall include broomcorn, Sudan grass, Johnson grass, and cane seed.

**Cracked kernels, foreign material, and other grains.**—Cracked kernels, foreign material, and other grains, shall include kernels and pieces of kernels of grain sorghums, and all other matter except dockage that will pass through a metal sieve perforated with equilateral triangular perforations the inscribed circles of which are  $\frac{5}{64}$  inch in diameter; also other grains and all other matter except grain sorghums and nongrain sorghums remaining on such sieve after screening.

**Damaged kernels.**—Damaged kernels shall be kernels and pieces of kernels of grain sorghums, nongrain sorghums, and other grains which are heat damaged, sprouted, frosted, badly ground damaged, moldy, or otherwise materially damaged.

**Heat-damaged kernels.**—Heat-damaged kernels shall be kernels and pieces of kernels of grain sorghums, nongrain sorghums, and other grains which have been materially discolored and damaged by external heat or as a result of heating caused by fermentation.

STANDARDS FOR FLAXSEED <sup>9</sup>

For the purposes of the official grain standards of the United States for flaxseed:

**Flaxseed.**—Flaxseed shall be any grain which, before the removal of dockage, consists of 50 percent or more of flaxseed and not more than 20 percent of other grains for which standards have been established under the provisions of the United States Grain Standards Act.

**Grades.**—Flaxseed shall be graded and designated according to the respective grade requirements of the numerical grades and Sample grade of these standards.

## Flaxseed

*Grade requirements for Flaxseed*

Grade No.	Minimum test weight per bushel	Maximum limits of damaged flaxseed
1-----	49 pounds-----	20 percent
2-----	47 pounds-----	30 percent
Sample grade-----	Sample grade shall include flaxseed which does not come within the requirements of either of the grades No. 1 or No. 2; or which contains fire-damaged flaxseed; or which contains more than 11 percent of moisture; or which is musty, or sour, or heating, or hot; or which has any commercially objectionable foreign odor; or which is otherwise of distinctly low quality.	

<sup>9</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

## Dockage

Dockage shall include all matter other than flaxseed which is contained in the lot of grain as a whole; also undeveloped, shriveled, and small pieces of flaxseed removed with the dockage and which cannot be recovered by properly rescreening or recleaning. The quantity of dockage shall be calculated in terms of percentage based on the total weight of the flaxseed including the dockage.

Dockage shall be stated in terms of whole percent. A fraction of a percent shall be disregarded. The word "Dockage", together with the percentage thereof, shall be added to the grade designation.

## Definitions

**Basis of grade determinations.**—Each determination of test weight, moisture, damage, and "fire damaged", shall be upon the basis of the grain after the removal of that part of the dockage which can be removed readily by the use of appropriate sieves and cleaning devices. All other determinations shall be upon the basis of the grain as a whole.

**Percentages.**—Percentages, except in the case of moisture, shall be percentages ascertained by weight.

**Percentage of moisture.**—Percentage of moisture shall be that ascertained by the air oven and the method of use thereof described in Service and Regulatory Announcements No. 147 of the Agricultural Marketing Service of the United States Department of Agriculture, or ascertained by any device and method which give equivalent results in the determination of moisture.

**Test weight per bushel.**—Test weight per bushel shall be the weight per Winchester bushel as determined by the testing apparatus and the method of use thereof described in Bulletin No. 1065, dated May 18, 1922, issued by the United States Department of Agriculture, or as determined by any device and method which give equivalent results in the determination of test weight per bushel.

**Damaged flaxseed.**—Damaged flaxseed shall be seeds and pieces of seeds of flaxseed which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged.

## STANDARDS FOR SOYBEANS<sup>10</sup>

### Terms Defined

For the purposes of the official grain standards of the United States for soybeans:

**Soybeans.** Soybeans shall be any grain which consists of 50 percent or more of whole or broken soybeans which will not pass readily through an  $\frac{5}{64}$  sieve and not more than 10 percent of other grains for which standards have been established under the United States Grain Standards Act.

**Classes.** Soybeans shall be divided into the following five classes: Yellow soybeans, green soybeans, brown soybeans, black soybeans, and mixed soybeans.

**Yellow soybeans.** Yellow soybeans shall be any soybeans which have yellow or green seed coats, and which in cross section are yellow or have a yellow tinge, and may include not more than 10 percent of soybeans of other classes.

**Green soybeans.** Green soybeans shall be any soybeans which have green seed coats, and which in cross section are green, and may include not more than 10 percent of soybeans of other classes.

**Brown soybeans.** Brown soybeans shall be any soybeans with brown seed coats, and may include not more than 10 percent of soybeans of other classes.

**Black soybeans.** Black soybeans shall be any soybeans with black seed coats, and may include not more than 10 percent of soybeans of other classes.

**Mixed soybeans.** Mixed soybeans shall be any mixture of soybeans which does not meet the requirements of the classes yellow soybeans, green soybeans, brown soybeans, or black soybeans. Bicolored soybeans shall be classified as mixed soybeans.

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<sup>10</sup> These specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.



**Grades.** Grades shall be the numerical grades, sample grade, and special grades provided for on pages 62-64.

**Bicolored soybeans.** Bicolored soybeans shall be any soybeans with seed coats of two colors, one of which is black or brown.

**Splits.** Splits shall be pieces of soybeans that are not damaged.

**Damaged kernels.** Damaged kernels shall be soybeans and pieces of soybeans which are heat-damaged, sprouted, frosted, badly ground-damaged, badly weather-damaged, moldy, diseased, or otherwise materially damaged.

**Heat-damaged kernels.** Heat-damaged kernels shall be soybeans and pieces of soybeans which are materially discolored and damaged by heat.

**Foreign material.** Foreign material shall be all matter, including soybeans and pieces of soybeans, which will pass readily through an 8/64 sieve and all matter other than soybeans remaining on such sieve after sieving.

**Stones.** Stones shall be concreted earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water.

**8/64 sieve.** An 8/64 sieve shall be a metal sieve 0.032 inch thick perforated with round holes 0.125 ( $\frac{8}{64}$ ) inch in diameter with approximately 4,736 perforations per square foot.

## Principles governing application of standards

The following principles shall apply in the determination of the classes and grades of soybeans:

**Basis of determination.** Each determination of class, splits, damaged kernels, and heat-damaged kernels, and of black, brown, and/or

bicolored soybeans in Yellow or Green Soybeans, shall be upon the basis of the grain when free from foreign material. All other determinations shall be upon the basis of the grain as a whole.

**Percentages.** All percentages shall be upon the basis of weight. The percentage of splits shall be expressed in terms of whole percents. All other percentages shall be expressed in terms of whole and tenths percents.

**Moisture.** Moisture shall be ascertained by the air-oven method prescribed by the United States Department of Agriculture, as described in Service and Regulatory Announcement No. 147, issued by the Agricultural Marketing Service, or ascertained by any method which gives equivalent results.

**Test weight per bushel.** Test weight per bushel shall be the weight per Winchester bushel as determined by the method prescribed by the United States Department of Agriculture, as described in Circular No. 921 issued June 1953, or as determined by any method which gives equivalent results.

## **Grades, grade requirements, and grade designations**

The following grades, grade requirements, and grade designations are applicable under these standards:

# Soybeans

*Grades and grade requirements for Soybeans.* (See also paragraphs on special grades, page 64.)

Grade	Minimum test weight per bushel	Maximum limits of—				
		Moisture	Splits	Damaged kernels		Foreign material
				Total	Heat damaged	
		<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1-----	56	13.0	10	2.0	0.2	1.0
2-----	54	14.0	20	3.0	0.5	2.0
3 <sup>1</sup> -----	52	16.0	30	5.0	1.0	3.0
4 <sup>2</sup> -----	49	18.0	40	8.0	3.0	5.0
Sample grade-----						

Sample grade shall be soybeans which do not meet the requirements for any of the grades from No. 1 to No. 4, inclusive; or which are musty, sour, or heating; or which have any commercially objectionable foreign odor; or which contain stones; or which are otherwise of distinctly low quality.

<sup>1</sup> Soybeans which are purple mottled or stained shall be graded not higher than No. 3.

<sup>2</sup> Soybeans which are materially weathered shall be graded not higher than No. 4.

## Grade Designation

The grade designation for soybeans shall include in the order named the number of the grade or the words "Sample grade," as the case may be; the name of the class; and the name of each applicable special grade. In the case of mixed soybeans, the grade designation shall also include, following the name of the class, the approximate percentages of yellow, green, brown, black, and bicolored soybeans in the mixture.

### Special Grades for Soybeans

#### *Garlicky soybeans*

**Requirements.** Garlicky soybeans shall be soybeans which contain 5 or more garlic bulblets in 1,000 grams.

**Grade designation.** Garlicky soybeans shall be graded and designated according to the grade requirements of the standards applicable to such soybeans if they were not garlicky and there shall be added to and make a part of the grade designation the word "garlicky."

#### *Weevily soybeans*

**Requirements.** Weevily soybeans shall be soybeans which are infested with live weevils or other live insects injurious to stored grain.

**Grade designation.** Weevily soybeans shall be graded and designated according to the grade requirements of the standards applicable to such soybeans if they were not weevily, and there shall be added to and made a part of the grade designation the word "weevily."

## STANDARDS FOR MIXED GRAIN <sup>11</sup>

### Terms defined

For the purposes of the Official Grain Standards of the United States for Mixed Grain:

**Mixed grain.** Mixed grain shall be any mixture of grains for which standards have been established under the United States Grain Standards Act, or any mixture of such grains and wild oats, or wild oats, providing that any of the mixtures do not come within the requirements of any of the standards for such grains, and that any of the mixtures or wild oats do not contain more than 50 percent of foreign material.

**Grades.** Grades shall be "Mixed Grain," "Sample grade Mixed Grain," and special grades provided for on pages 67-70.

**Wild oats.** Wild oats shall be the seeds of *Avena fatua* and *A. sterilis*.

**Foreign material.** Foreign material shall be all matter except wild oats and grains for which standards have been established under the United States Grain Standards Act.

**Damaged kernels.** Damaged kernels shall be all kernels and pieces of kernels of wild oats and grains for which standards have been established under the United States Grain Standards Act, which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, moldy, diseased, or otherwise materially damaged.

**Heat-damaged kernels.** Heat-damaged kernels shall be kernels and pieces of kernels of wild oats and grains for which standards have been established under the United States Grain Standards Act, which have been materially discolored and damaged by heat.

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<sup>11</sup> The specifications of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.



**Stones.** Stones shall be concreted earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water.

## Principles governing application of standards

The following principles shall apply in the determination of the grades for mixed grain:

**Basis of determination.** All determinations shall be on the basis of the grain as a whole.

**Percentages.** All percentages shall be determined upon the basis of weight. The percentage of each kind of grain, including wild oats, and foreign material shall be stated in terms of whole percents. A fraction of a percent shall be disregarded.

**Moisture.** Moisture shall be determined by the air-oven method prescribed by the United States Department of Agriculture as described in Service and Regulatory Announcements No. 147 (1959 revision), issued by the Agricultural Marketing Service for the kind of grain which predominates in the mixture or determined by any method which gives equivalent results.

**Test weight per bushel.** Test weight per bushel shall be the weight per Winchester bushel as determined by the method prescribed by the United States Department of Agriculture as described in Circular No. 921, issued June 1953, or as determined by any method which gives equivalent results.

## Grades, grade requirements, and grade designations

The following grades, grade requirements, and grade designations are applicable under these standards:

*Grades and grade requirements for Mixed Grain.*  
(See also paragraphs on special grades, pages 67-70.)

## Grade Requirements

*Mixed Grain (Grade).* The grade "Mixed Grain" shall be mixed grain with not more than 15.0 percent of damaged kernels, but not more than 3.0 percent of heat-damaged kernels, and which otherwise does not come within the specifications for "Sample grade Mixed Grain."

*Sample grade Mixed Grain.* The grade "Sample grade Mixed Grain" shall be mixed grain which does not meet the requirements of the grade "Mixed Grain"; or which contains more than 16.0 percent of moisture; or which contains stones; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor except of smut or garlic; or which is otherwise of distinctly low quality.

## Grade Designations

*Grade designations for mixed grain.* The grade designation for mixed grain shall include in the order named, (1) the words "Mixed Grain" or the words "Sample grade Mixed Grain," as the case may be; (2) the name and approximate percentage of each kind of grain, including wild oats, which constitutes 10 percent or more of the mixture in the order of predominance; (3) when applicable, the words "Other Grains" followed by a statement of the percentage of the combined quantity of those kinds of grains, including wild oats, each of which is present in a quantity less than 10 percent; (4) the words "Foreign Material" together with a statement of the percentage thereof; and (5) the name of each applicable special grade.

## Special Grades for Mixed Grain

### *Tough mixed grain*

**Requirements.** Tough mixed grain shall be mixed grain which contains more than 14.5 percent but not more than 16.0 percent of moisture.

**Grade designation.** Tough mixed grain shall be graded according to the grade requirements of the standards applicable to such mixed grain if it were not tough, and there shall be added to and made a part of the grade designation the word "Tough."

*Smutty mixed grain*

**Requirements.** Smutty mixed grain shall be (a) mixed grain in which wheat or rye predominates, and which contains balls, portions of balls, or spores, of smut, in excess of a quantity equal to 14 balls of average size in 250 grams of mixed grain, or (b) any other mixed grain which has the kernels covered with smut spores, or which contains smut masses and/or smut balls in excess of 0.2 percent.

**Grade designation.** Smutty mixed grain shall be graded and designated according to the grade requirements of the standards applicable to such mixed grain if it were not smutty, and there shall be added to and made a part of the grade designation, the word "Smutty."

*Ergoty mixed grain*

**Requirements.** Ergoty mixed grain shall be mixed grain which contains ergot in excess of 0.3 percent.

**Grade designation.** Ergoty mixed grain shall be graded and designated according to the grade requirements of the standards applicable to such mixed grain if it were not ergoty, and there shall be added to and made a part of the grade designation, the word "Ergoty."

*Garlicky mixed grain*

**Requirements.** Garlicky mixed grain shall be (a) mixed grain in which wheat or rye predominates, and which contains 2 or more green garlic bulblets, or an equivalent quantity of dry or

partly dry bulblets, in 1,000 grams of mixed grain; or (b) mixed grain in which grains other than wheat and rye predominate, and which contains 4 or more green garlic bulblets, or an equivalent quantity of dry or partly dry bulblets, in 500 grams of mixed grain.

**Grade designation.** Garlicky mixed grain shall be graded and designated according to the grade requirements of the standards applicable to such mixed grain if it were not garlicky, and there shall be added to and made a part of the grade designation, the word "Garlicky."

*Weevily mixed grain*

**Requirements.** Weevily mixed grain shall be mixed grain which is infested with live weevils or other insects injurious to stored grain.

**Grade designation.** Weevily mixed grain shall be graded and designated according to the grade requirements of the standards applicable to such mixed grain if it were not weevily, and there shall be added to and made a part of the grade designation, the word "Weevily."

*Blighted mixed grain*

**Requirements.** Blighted mixed grain shall be all mixed grain in which barley predominates and which, as a whole, contains more than 4 percent of barley damaged or materially discolored by blight and/or mold.

**Grade designation.** Blighted mixed grain shall be graded and designated according to the grade requirements of the standards applicable to such mixed grain if it were not blighted, and there shall be added to and made a part of the grade designation, the word "Blighted."

*Treated mixed grain*

**Requirements.** Treated mixed grain shall be mixed grain which has been scoured, limed, washed, sulphured, or treated in such a manner that its true quality is not reflected by either the grade "Mixed Grain" or "Sample grade Mixed Grain."

**Grade designation.** Treated mixed grain shall be graded and designated according to the grade requirements of the standards applicable to such mixed grain if it were not treated, and there shall be added to and made a part of the grade designation, a statement indicating the kind of treatment.



# IMPORTANT FEATURES OF GRAIN INSPECTION

The United States Grain Standards Act provides in part as follows:

## INSPECTION REQUIREMENTS

"SEC. 4. That whenever standards shall have been fixed and established under this act for any grain no person thereafter shall ship or deliver for shipment in interstate or foreign commerce any such grain which is sold, offered for sale, or consigned for sale by grade unless the grain shall have been inspected and graded by an inspector licensed under this act and the grade by which it is sold, offered for sale, or consigned for sale be one of the grades fixed therefor in the official grain standards of the United States: *Provided*, That any person may sell, offer for sale, or consign for sale, ship or deliver for shipment in interstate or foreign commerce any such grain by sample or by type, or under any name, description, or designation which is not false or misleading, and which name, description, or designation does not include in whole or in part the terms of any official grain standard of the United States: *Provided further*, That any such grain sold, offered for sale, or consigned for sale by grade may be shipped or delivered for shipment in interstate or foreign commerce without inspection at point of shipment by an inspector licensed under this act, to or through any place at which an inspector licensed under this act is located, subject to be inspected by a licensed inspector at the place to which shipped or at some convenient point through which shipped for inspection, which inspection shall be under such rules and regulations as the Secretary of Agriculture shall prescribe, and subject further

to the right of appeal from such inspection, as provided in section 6 of this act: *And provided further*, That any such grain sold, offered for sale, or consigned for sale by any of the grades fixed therefor in the official grain standards may, upon compliance with the rules and regulations prescribed by the Secretary of Agriculture, be shipped in interstate or foreign commerce without inspection from a place at which there is no inspector licensed under this act to a place at which there is no such inspector, subject to the right of either party to the transaction to refer any dispute as to the grade of the grain to the Secretary of Agriculture, who may determine the true grade thereof. No person shall in any certificate or in any contract or agreement of sale or agreement to sell by grade, either oral or written, involving, or in any invoice or bill of lading or other shipping document relating to, the shipment or delivery for shipment, in interstate or foreign commerce, of any grain for which standards shall have been fixed and established under this act, describe, or in any way refer to, any of such grain as being of any grade other than a grade fixed therefor in the official grain standards of the United States."

### MISREPRESENTATION

"SEC. 5. That no person, except as permitted in section 4, shall represent that any grain shipped or delivered for shipment in interstate or foreign commerce is of a grade fixed in the official grain standards other than as shown by a certificate therefor issued in compliance with this act; and the Secretary of Agriculture is authorized to cause examinations to be made of any grain for which standards shall have been fixed and established under this act, and which has been certified to conform to any grade fixed therefor in such official grain standards, or which

has been shipped or delivered for shipment in interstate or foreign commerce. Whenever, after opportunity for hearing is given to the owner or shipper of the grain involved, and to the inspector thereof if the same has been inspected, it is determined by the Secretary that any quantity of grain has been incorrectly certified to conform to a specified grade, or has been sold, offered for sale, or consigned for sale under any name, description, or designation which is false or misleading, he may publish his findings."

### APPEALS, FINDINGS, AND FEES

"SEC. 6. Whenever standards shall have been fixed and established under this Act for any grain and any quantity of such grain sold, offered for sale, or consigned for sale, or which has been shipped, or delivered for shipment in interstate or foreign commerce shall have been inspected and a dispute arises as to whether the grade as determined by such inspection of any such grain in fact conforms to the standard of the specified grade, any interested party may, either with or without reinspection, appeal the question to the Secretary of Agriculture, and the Secretary of Agriculture is authorized to cause such investigation to be made and such tests to be applied as he may deem necessary and to determine the true grade: *Provided*, That any appeal from such inspection and grading to the Secretary of Agriculture shall be taken before the grain leaves the place where the inspection appealed from was made and before the identity of the grain has been lost, under such rules and regulations as the Secretary of Agriculture shall prescribe. Whenever an appeal shall be taken or a dispute referred to the Secretary of Agriculture under this Act, he shall charge and assess, and cause to be collected, a reasonable fee, in amount to be fixed by him. The fee, in case of an appeal, shall be refunded if the appeal is sustained. All such fees, not so refunded, shall

be deposited and covered into the Treasury as miscellaneous receipts. The Secretary of Agriculture is authorized to pay employees assigned to perform appeal inspections for all overtime, night, or holiday work at such rates as he may determine and to accept from persons, Government agencies and departments, and Government corporations for whom such work is performed reimbursement for any sums paid for such work. The findings of the Secretary of Agriculture as to grade, signed by him or by such officer or officers, agent or agents, of the Department of Agriculture as he may designate, made after the parties in interest have had opportunity to be heard, shall be accepted in the courts of the United States as *prima facie* evidence of the true grade of the grain determined by him at the time and place specified in the findings."

### LICENSING OF INSPECTORS

"SEC. 7. The Secretary of Agriculture may issue a license to any person, upon presentation to him of satisfactory evidence that such person is competent, to inspect and grade grain and to certificate the grade thereof for shipment or delivery for shipment in interstate or foreign commerce, under this act and the rules and regulations prescribed thereunder. No person authorized or employed by any State, county, city, town, board of trade, chamber of commerce, corporation, society, partnership, or association to inspect or grade grain shall certify; or otherwise state or indicate in writing, that any grain for shipment or delivery for shipment in interstate or foreign commerce, which has been inspected or graded by him, or by any person acting under his authority, is of one of the grades of the official grain standards of the United States, unless he holds an unsuspended and unrevoked license issued by the Secretary of Agriculture. \* \* \*"



## PENALTIES

"SEC. 9. Any person who shall knowingly violate any of the provisions of Sections 4 or 7 of this Act, or any inspector licensed under this Act, or *any person sampling grain for inspection under this Act*, who shall knowingly inspect, grade, or *sample* improperly any grain which has been shipped or delivered for shipment in interstate or foreign commerce, or shall knowingly give any false or *incorrect* certificate of grade, or shall accept money or other consideration, directly or indirectly, for any neglect or improper performance of duty, and any person who shall improperly influence or attempt to improperly influence any such inspector or *sampler* in the performance of his duty, or *shall knowingly or willfully cause, or attempt to cause, the issuance of a false or incorrect certificate of grade under this Act by deceptive loading, handling, or sampling of grain, or by submitting grain for inspection knowing that it has been so loaded, handled, or sampled, or by any other means*, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not more than \$1,000, or be imprisoned not more than one year, or both."

## REGULATIONS

Section 8 of the Grain Standards Act authorizes the Secretary of Agriculture to make such rules and regulations as he may deem necessary for the efficient execution of the provisions of the Act. Pursuant to this authority, the Secretary of Agriculture has issued regulations under the Act. Copy of the regulations as well as the complete text of the Act may be had upon application to any office of the Grain Division, or to the Administrator, Agricultural Marketing Service, Washington 25, D. C.



## BASIS OF INSPECTION

The basis of inspection for commercial lots of grain is governed by instructions which are summarized as follows:

In the case of a car, truck, or wagon lot of grain which is generally or reasonably uniform in quality and condition throughout the lot, the grade should be based on a representative sample resulting from a composite of the probings taken from different parts of the lot.

In the case of a car, truck, or wagon lot of grain which is not generally uniform as to quality or condition, care must be exercised, in basing the grade, to insure that the grade assigned will reflect as nearly as may be the quality of the entire lot of grain. In cases where the variations in quality or condition are not material, the grade should be based on a composite sample of all the probings taken from different parts of the lot. However, in cases where the variations in quality or condition are marked by distinct and outstanding differences between portions of the grain, each portion should be regarded as if it were a separate lot or unit for inspection and grading, and the grade of each portion should be based upon a sample representative of it.

In the inspection and grading of lots, parcels, and cargoes of grain loaded aboard boats, barges, and other vessels, licensed inspectors shall be governed by the following requirements:

1. If such a lot, parcel, or cargo tendered for inspection and grading be uniform in quality and condition, the grade shall be based upon an average sample thereof;

2. If such lot, parcel, or cargo so tendered is not uniform in quality and condition by reason of the presence therein of a material portion of grain of a different grade, the licensed inspector shall consider the portions of such lot, parcel, or

cargo which are of different grades as separate lots tendered for inspection, and shall separately inspect, grade, and certificate as to grade such different portions; and each such certificate of grade shall bear a statement to the effect that the grain to which it applies has been loaded on board with other grain, the grade, description, and approximate quantity of which shall be specified.

## SAMPLING OF GRAIN

The taking of a correct and representative sample of a lot or parcel of grain for inspection and grading purposes is an important and essential part of grain inspection. If the sample obtained is not representative no amount of care in making the determinations for the grading factors will establish the true grade of the grain involved. For correct grading it is essential that the sample, properly identified, be preserved in its original condition from the time it is taken until the grade is determined and that it be of sufficient size to permit the required tests to be performed.

The basic instructions governing the methods for sampling grain are summarized as follows:

The size of the sample shall be not less than approximately 2 quarts. If the time to elapse between the drawing of the sample and the determination of the grade would permit of such changes in the condition of the sample as to affect the grade assigned to the lot or parcel from which the sample was taken, at least  $1\frac{1}{2}$  pints of the grain shall be enclosed in an air-tight container and the remainder, if any, in a cloth bag.

In the case of bulk grain in a car, truck, or wagon, or in any other container in which the grain is of about the same depth as in a carload, the sample shall be taken with a double-tube compartment probe by probing flaxseed in seven or more places and all other kinds of grain in

five or more places, well distributed in different parts of the car, truck, or other container. In the discretion of the sampler and/or inspector, as many more probings as may be necessary shall be taken from the grain in different parts of the lot.

Bulk grain in cars, trucks, or other vehicle may also be sampled when such grain is being loaded or unloaded by taking a sample from the running stream of grain by the use of the "Pelican" (fig. 1) or other suitable device.

In the case of bulk grain tendered for inspection as it lies in a boat, barge, or other vessel, samples shall be taken with a double-tube compartment grain probe of either standard or special length by probing at regular spaced intervals throughout the entire lot, provided that all of the grain so tendered is accessible for proper sampling. If the grain is of such depth or stowed in such a manner that representative samples of the entire lot cannot be obtained by the sampling methods prescribed in this paragraph, the grain shall be considered as inaccessible for sampling within the vessel.

In the case of bulk grain being loaded for inspection and grading aboard a boat, barge, or other vessel, the sample shall be taken from the loading spout or other convenient place en route, by the use of a device known as "The Pelican spout sampler" (fig. 1) or any other device giving equivalent results. The stream or streams shall be sampled at regular and frequent intervals to assure a correct and representative sample of the lot.

In the case of grain tendered for inspection as it is being discharged from a boat, barge, or other vessel, the sample shall be taken from the running stream or at some other convenient place after it leaves the vessel and before its identity

is lost. The sample shall be taken in such a manner that it will be a correct and representative sample of the lot.

If after examination of the separate probes, or cuts with the Pelican, no material portion of the grain is distinctly inferior to the remainder of the grain, the grain from the separate probes or from each separate cut with the Pelican, shall be combined and the combined sample shall be regarded as an average sample of the grain involved.

Whenever it shall appear, as a result of the sampling, that a material portion of any lot or parcel of grain is distinctly inferior, in any manner, to the remainder of such lot or parcel; also whenever, in the case of grain loaded, or being loaded aboard, or being discharged from, a barge, boat, or steamship, a material portion of such grain is of a different grade from the remainder, separate samples shall be taken of such distinctly inferior grain and of the remaining portion, or of the grain of each of the distinctly different grades, as the case may be. There shall be filed with each of the separate samples so taken a statement of the estimated quantity of grain it represents.

The detailed official current instructions for the proper sampling of grain may be obtained by applying to any office of the Grain Division.



## SPOUT SAMPLER OR "PELICAN"

For obtaining a representative sample from a falling stream of bulk grain, and particularly for sampling bulk grain being spouted into the holds of a vessel, a spout sampler, generally referred to as a "Pelican" (fig. 1), is used.

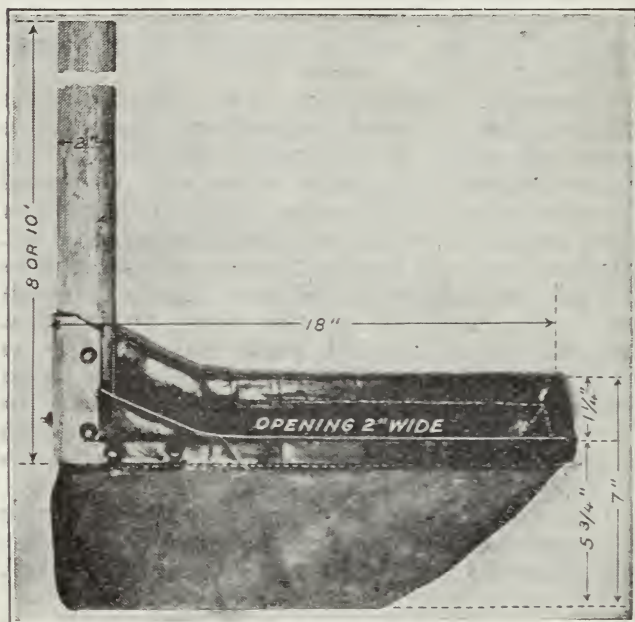


FIGURE 1,—Spout sampler (Pelican).

The use of this device makes it possible to obtain complete cross sections from the stream of grain being sampled. In operation the stream of grain is cut at frequent intervals and the samples obtained are then reduced in size by being put through a Boerner sampler (fig. 3).



## GRAIN PROBE (TRIER) AND SAMPLING CANVAS

For obtaining a representative sample from a carload of bulk grain, a double-tube grain probe (trier) as shown in figure 2 is used. Such a probe makes it possible for the sampler ordinarily to note any unevenness in loading and to ascertain the approximate location and quantity of any mixture of grain or of dirty, smutty, heating, or damp spots, etc., found in the grain.

A canvas slightly longer than the probe is used. The grain should be emptied lengthwise on the canvas, each separate probeful apart from the others, so that the grain from each compartment can be examined separately.

Detailed specifications of the probe, and the canvas may be obtained by applying to any office of the Grain Division.

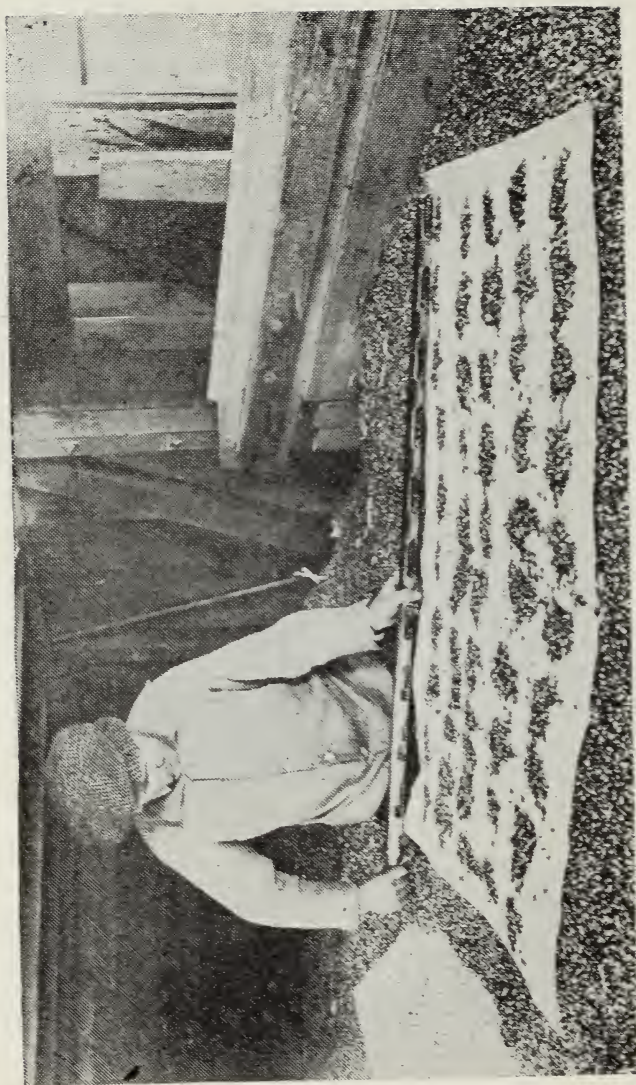


FIGURE 2.—Sampling grain.

## SAMPLE DIVIDER (BOERNER DIVIDER)

After a representative sample of the lot or parcel of grain to be graded is obtained, it is usually necessary to reduce its size considerably, in order that the grade may be determined by careful analysis. To reduce the size of a sample of grain containing foreign substances of different specific gravity or size than of the grain with which they are mixed, and at the same time obtain a sample as representative as the original, is hardly possible except by mechanical means.

Figure 3 shows a device, generally referred to as the "Boerner divider", which will divide a sample into smaller portions and still maintain the proper proportions for the various factors of the original sample. In the operation of this device the grain is placed in a hopper at the top of the machine and is then released, when it passes through an opening at the bottom of the hopper and down the sides of a cone, the point of which is directly under the center of the opening. Around the base of the cone are 36 pockets or openings. The grain falling down the sides of the cone is cut into 36 separate streams, which, a little farther on, merge into 2 streams. Streams nos. 1, 3, 5, etc., unite into 1 stream which empties into one receptacle, and streams nos. 2, 4, 6, 8, etc., unite into another stream which empties into a second receptacle.

This device and a simplified form of it are fully described in United States Department of Agriculture Bulletin No. 287.

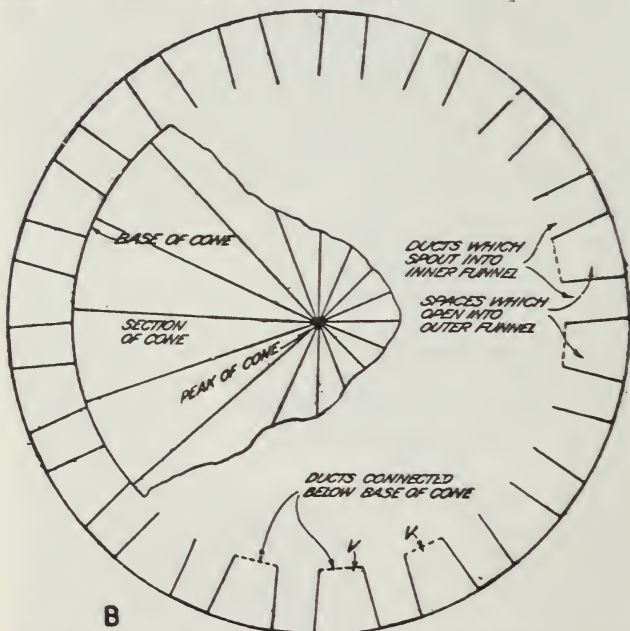
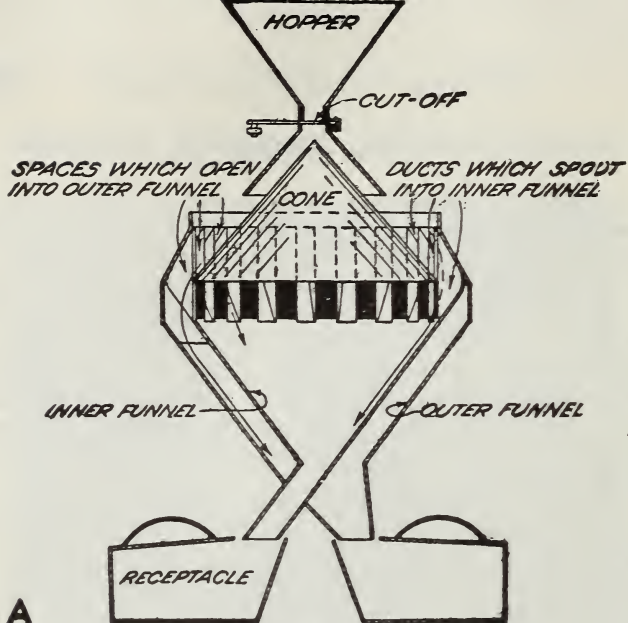


FIGURE 3.—Sample divider: A, vertical cross section of device showing paths taken by the material in passing from the hopper to the container; B, cross section of the device at the base of the cone.



## DOCKAGE TESTER

A dockage tester with which uniform results can be obtained is used in all offices of the Grain Division and by many grain inspectors in making dockage tests and certain designated sieving tests of grain. (Fig. 4.) Information concerning the dockage tester and its method of use may be obtained by applying to any office of the Grain Division.

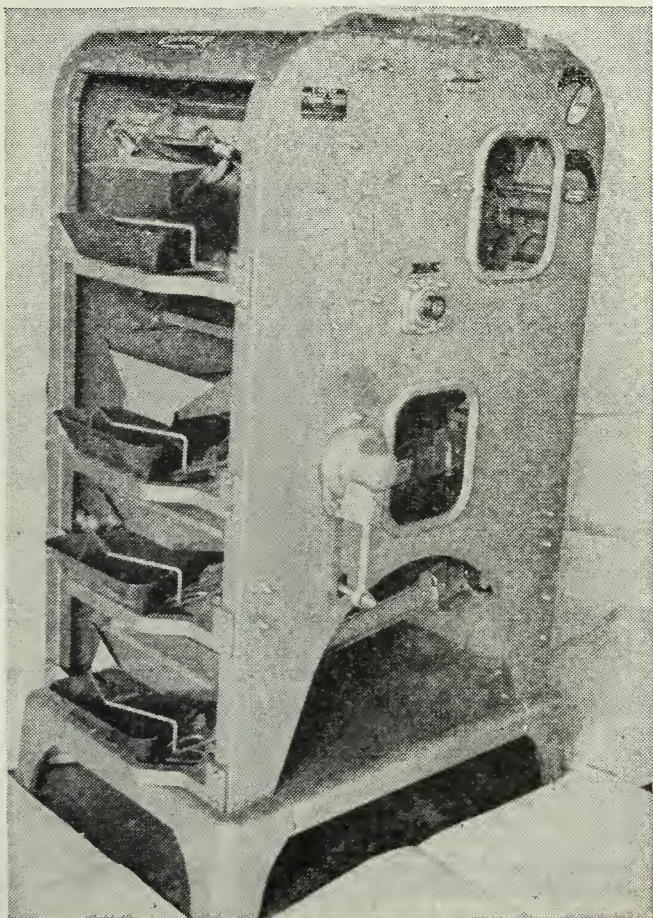


FIGURE 4.—Dockage tester.



## GRAIN-TESTING SIEVES

Standardized grain-testing sieves with accurate perforations are essential in making uniform sieving and dockage tests. Standardized sieves are specified for use in connection with the enforcement of the United States Grain Standards Act. The completed sieves are made up in the form of flat sieves or as step metal sieves for use in a dockage machine or as hand sieves. The hand sieves are 13 inches in diameter, and have slightly flaring sides 2 inches high, with rolled-top edges, and are made to nest with each other and with a bottom pan.

*Specifications for Sieve Metal*

Kind and quality of metal..	Sheet aluminum designated commercially as 3 SH-14 (formerly 3S- $\frac{1}{2}$ hard).
Thickness of metal.....	No. 20 B&S gauge, decimal equivalent 0.0319, plus or minus 0.0015 inch.
Accuracy of perforation.....	Precision sieves, plus or minus 0.005 inch; Commercial sieves, approximate.
Condition of sieve metal....	Shall be cleanly punched, free from burrs and other surface imperfections.

## SPECIFICATIONS FOR ROUND-HOLE, OBLONG-HOLE, AND SLOTTED-HOLE SIEVES

Common designation (inch)	Diameter or width	Length	Center to center	End bridges	Grade of perforations
ROUND-HOLE SIEVES <sup>1</sup>					
	<i>inch</i>	<i>inch</i>	<i>inch</i>	<i>inch</i>	
2 $\frac{1}{2}$ /64.....	0.0391	-----	0.075	-----	Precision.
4 $\frac{1}{2}$ /64.....	0.0703	-----	$\frac{1}{8}$	-----	Precision.
5/64.....	0.0781	-----	$\frac{5}{32}$	-----	Precision.
1/12.....	0.0833	-----	$\frac{1}{8}$	-----	Precision.
8/64.....	0.1250	-----	$\frac{3}{16}$	-----	Precision.
12/64.....	0.1875	-----	$\frac{1}{4}$	-----	Precision.

<sup>1</sup> Perforations of each row shall be staggered with respect to perforations in adjacent rows.

## SPECIFICATIONS FOR ROUND-HOLE, OBLONG-HOLE, AND SLOTTED-HOLE SIEVES—Continued

Common designation (inch)	Diameter or width	Length	Center to center	End bridges	Grade of perforations
OBLONG-HOLE SIEVES <sup>2</sup>					
	<i>inch</i>	<i>inch</i>	<i>inch</i>	<i>inch</i>	
3/64 by 3/8-----	0.0469	0.375	$\frac{1}{8}$	0.055	Precision.
0.064 by 3/8-----	0.0640	0.375	$\frac{1}{8}$	0.0525	Precision.
4½/64 by ½-----	0.0703	0.50	$\frac{5}{32}$	0.0625	Commercial.
8/64 by 3/4-----	0.1250	0.75	$\frac{1}{4}$	$\frac{5}{32}$	Commercial.
9/64 by 3/4-----	0.1406	0.75	$\frac{1}{4}$	$\frac{5}{32}$	Commercial.
10/64 by 3/4-----	0.1562	0.75	$\frac{5}{16}$	$\frac{5}{32}$	Commercial.
SLOTTED-HOLE SIEVES <sup>2</sup>					
5/64 by 3/4-----	0.0781	0.75	$\frac{3}{16}$	$\frac{5}{32}$	Precision.
5½/64 by 3/4-----	0.0859	0.75	$\frac{3}{16}$	$\frac{5}{32}$	Precision.

<sup>2</sup> Perforations of the slotted-hole sieves and the oblong-hole sieves shall be end staggered.

## SPECIFICATIONS FOR TRIANGULAR-HOLE SIEVES

Common designation (inch)	Spacing	Diameter of inscribed circle	Center to center	Grade of perforations
5/64-----	Single <sup>1</sup> -----	<i>inch</i> 0.0781	<i>inch</i> $\frac{1}{4}$	Precision.
0.089-----	Double-----	0.089	0.134	Commercial.

<sup>1</sup> Perforations of each row shall be staggered with respect to perforations in adjacent rows.

## **BASIS OF DETERMINATION FOR TEST WEIGHT PER BUSHEL**

The official standards provide that the determination of the test weight per bushel in the case of wheat, rye, and barley shall be made upon the basis of the grain from which the dockage has been removed; in the case of flaxseed the test-weight determination shall be made upon the basis of the flaxseed after the removal of that part of the dockage which can be removed readily by the use of appropriate sieves and cleaning devices; and in the case of all other grain the test-weight determination shall be made upon the basis of the grain as a whole.

As the test weight per bushel is one of the main factors in determining the grade of grain,  $1\frac{1}{8}$  quarts of the grain should be available to permit the test weight to be made with a quart tester.

## **STANDARD METHOD OF MAKING TEST- WEIGHT-PER-BUSHEL DETERMINATION**

The conditions given in the method described below have been found to be essential in making uniform tests of weight per bushel and obtaining accurate results, and have been adopted as standard in connection with the enforcement of the United States Grain Standards Act.

(1) Make the test immediately after the sample has been brought to the inspection room, office, or laboratory, to prevent drying out of the grain with consequent change in its test weight.

(2) Use  $1\frac{1}{8}$  quarts of grain for making the test.

(3) Fill the kettle from a hopper.

(4) Opening at bottom of hopper must be round and exactly  $1\frac{1}{4}$  inches in diameter.

(5) Bottom of opening must be centered over the kettle and held exactly 2 inches above the top of kettle.

(6) The quart kettle must have a capacity of exactly 67.2 cubic inches. The inside height of the quart kettle shall be 4 inches.

(7) If the top of the kettle is rough, smooth down the roughness with a rounded metal bar, but do not use a file for the purpose.

(8) Have the kettle rest on a firm base.

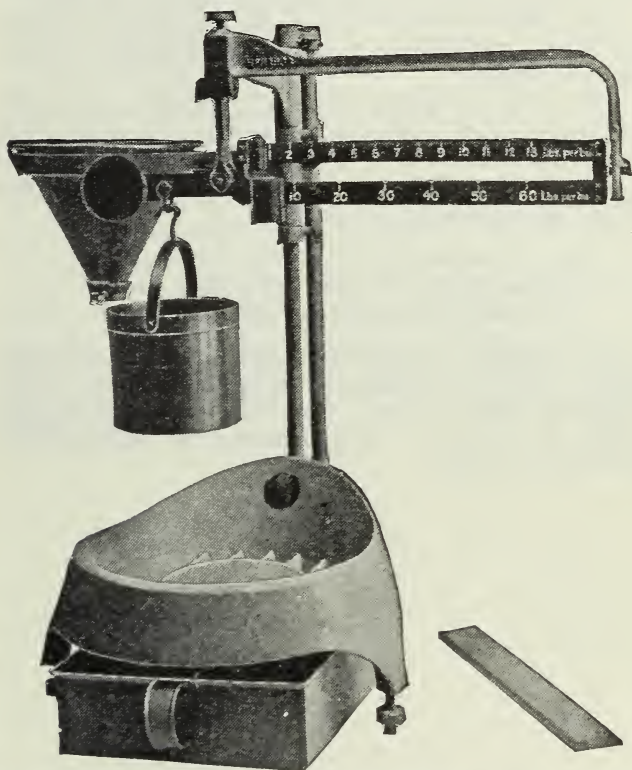


FIGURE 5.—Standard apparatus for determining the test weight per bushel of grain.

(9) Do not jar the kettle before or during the stroking operation.

(10) Use a stroker made of hardwood with smooth, perfect half-round edges, 12 inches long,  $\frac{3}{8}$  inch thick, and  $1\frac{3}{4}$  inches broad.

(11) Place the stroker on the edge of the kettle lightly without jarring the kettle.

(12) Hold the stroker on the kettle with the sides of the stroker in a vertical position.

(13) Stroke the grain from the kettle with three full-length zigzag motions of the stroker.

(14) Make each stroke clean all the way across the kettle with the stroker always lightly touching the kettle.

(15) Use a beam which is both accurately graduated and sensitive to one-tenth pound per bushel.

(16) Have the weight-per-bushel apparatus tested periodically for—

- (a) Accuracy of kettle,
- (b) Accuracy of beam readings, and
- (c) Sensitiveness of beam.

The method of testing the accuracy of the test kettle and the accuracy and sensitiveness of the weighing beam of any weight-per-bushel testing outfit is given in Department of Agriculture Circular No. 921.



## METHODS OF MAKING MOISTURE TESTS

The official grain standards require that percentage of moisture shall be that ascertained by the use of specified air-oven methods, or that ascertained by any device or method which gives equivalent results. The air-oven apparatus and its methods of use in the determination of moisture content are described in Service and Regulatory Announcements No. 147 (1959 revision) of the Agricultural Marketing Service of the United States Department of Agriculture.

In order that rapid determinations of moisture in grain may be made to meet the routine requirements of practical inspection work, grain inspectors may use electric moisture meters or other apparatus and methods which give moisture-test results equivalent to the results obtained with the prescribed air-oven methods. Although the air-oven methods are specified as the basic methods for determining moisture content for the purposes of the standards, it is intended that these methods will be used principally for the purpose of checking and standardizing the electric moisture meters or other moisture-testing equipment and methods used in routine grain-inspection work.

## ELECTRIC MOISTURE METER

An electric moisture meter with which rapid determinations of the moisture content of grain can be made is in general use in grain-inspection work.

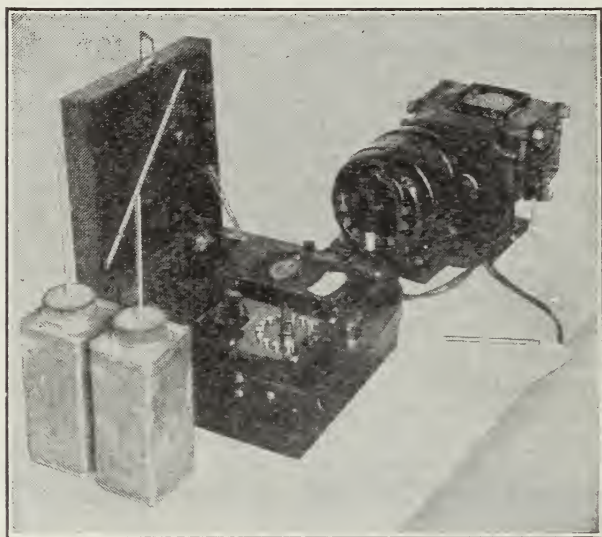


FIGURE 6.—Electric moisture meter.

A description of the method of using the electric moisture meter illustrated in figure 6, including the necessary conversion charts, is given in pamphlet U. S. G. S. A.-M. B. I.-1, the latest revised copy of which can be obtained from any office of the Grain Division.

**EQUIPMENT USED IN GRAIN INSPECTION**

- (1) Bulk grain probe.
- (2) Spout sampler (Pelican).
- (3) Sack probe (trier).
- (4) Sampling canvas.
- (5) Waterproof sample bags.
- (6) Airtight containers.
- (7) Sample divider (Boerner divider).
- (8) Dockage tester.
- (9) Hand sieves.
- (10) Test-weight-per-bushel apparatus.
- (11) Moisture tester.
- (12) Balances: one 1,200-gram and one 100-gram capacity.
- (13) Barley pearler.
- (14) Sulphur-testing apparatus.
- (15) Smut dockage machine (for Pacific Coast).
- (16) Miscellaneous: grain pans, tweezers, tables, etc.









